MITSUBISHI

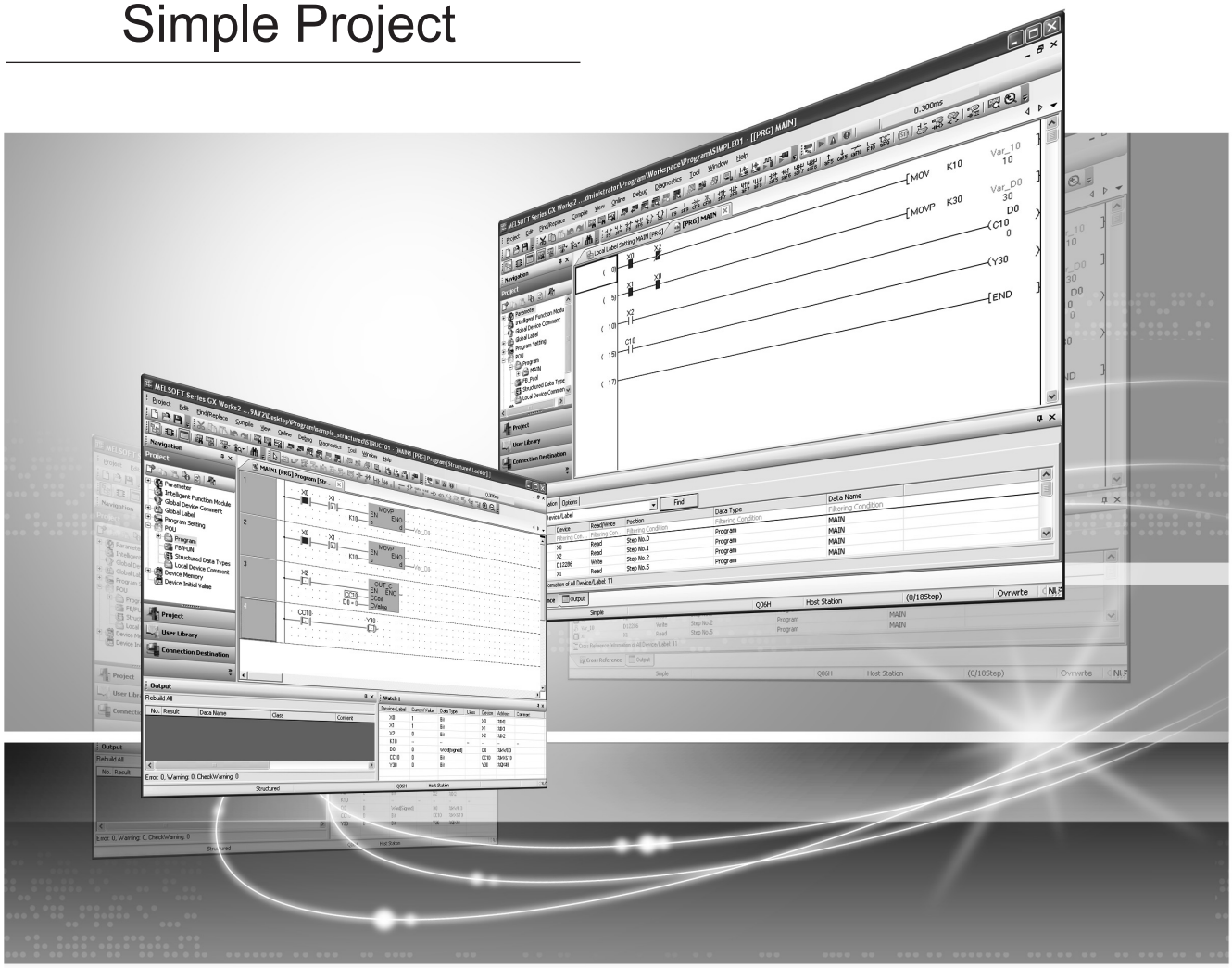
MELSOFT

Integrated FA Software

# GX Works2 Version 1

## Operating Manual

### Simple Project



**MELSOFT**
**Integrated FA Software**

SW1DNC-GXW2-E

# ● SAFETY PRECAUTIONS ●

(Always read these instructions before using this product.)

Before using this product, thoroughly read this manual and the relevant manuals introduced in this manual and pay careful attention to safety and handle the products properly.
The precautions given in this manual are concerned with this product. For the safety precautions of the programmable controller system, refer to the User's Manual for the CPU module.

In this manual, the safety precautions are ranked as "⚠WARNING" and "⚠CAUTION".

| | |
|---|---|
| ⚠ WARNING | Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury. |
| ⚠ CAUTION | Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage. |

Note that the ⚠CAUTION level may lead to serious consequences according to the circumstances. Always follow the precautions of both levels because they are important for personal safety.

Please save this manual to make it accessible when required and always forward it to the end user.

## [Design Instructions]

### ⚠WARNING

- **When data change, program change, or status control is performed from a personal computer to a running programmable controller, create an interlock circuit outside the programmable controller to ensure that the whole system always operates safely.**
  **Furthermore, for the online operations performed from a personal computer to a programmable controller CPU, the corrective actions against a communication error due to such as a cable connection fault should be predetermined as a system.**

## [Startup/Maintenance Instructions]

### ⚠CAUTION

- **The online operations performed from a personal computer to a running programmable controller CPU (Program change when a programmable controller CPU is RUN, operating status changes such as forced input/output operation and RUN-STOP switching, and remote control operation) must be executed after the manual has been carefully read and the safety has been ensured.**
  **When changing a program while a programmable controller CPU is RUN, it may cause a program corruption in some operating conditions. Fully understand the precautions described in GX Works2 Version 1 Operating Manual (Common) before use.**
- **The positioning test functions of OPR, JOG, inching or positioning data for QD75/LD75 positioning module must be executed with the programmable controller set to STOP after the manual has been carefully read and the safety has been ensured. Specially when executing the function on the network system, ensure the safety thoroughly since the machinery whose operation cannot be checked by an operator may be activated. The operation failure may cause the injury or machine damage.**

# ● CONDITIONS OF USE FOR THE PRODUCT ●

(1) Mitsubishi programmable controller ("the PRODUCT") shall be used in conditions;
i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and
ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.
MITSUBISHI SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI'S USER, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT.
("Prohibited Application")
Prohibited Applications include, but not limited to, the use of the PRODUCT in;
- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

Notwithstanding the above, restrictions Mitsubishi may in its sole discretion, authorize use of the PRODUCT in one or more of the Prohibited Applications, provided that the usage of the PRODUCT is limited only for the specific applications agreed to by Mitsubishi and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the PRODUCTs are required. For details, please contact the Mitsubishi representative in your region.

## REVISIONS

The manual number is written at the bottom left of the back cover.

| Print date | Manual number | Revision |
|---|---|---|
| Jul., 2008 | SH(NA)-080780ENG-A | First edition |
| Jan., 2009 | SH(NA)-080780ENG-B | Model Addition<br>Q00UJ, Q00U, Q01U, Q10UDH, Q10UDEH, Q20UDH, Q20UDEH, FX series<br><br>Addition<br>MANUALS, Section 2.2.8, Section 2.2.9, Section 5.2.2, Section 5.3.5, Section 11.3.4<br><br>Correction<br>GENERIC TERMS AND ABBREVIATIONS IN THIS MANUAL, Section 1.1,<br>Section 1.3.1, Section 1.3.2, Section 2.1, Section 3.1, Section 5.2.1, Section 5.2.3,<br>Section 5.3.3, Section 5.4, Section 5.6, Section 5.6.2, Section 7.1.1, Section 7.1.2,<br>Section 7.1.5, Section 7.1.6, Section 8.2, Section 8.2.1, Section 8.3, Section 8.4,<br>Section 8.5.1, Section 9.2, Section 9.3, Section 9.4, Section 9.5, Section 9.8,<br>Section 9.8.1, Section 10.1, Section 11.1, Section 11.3.2, Section 12.2, Appendix 1.1,<br>Appendix 1.5, Appendix 1.6<br>Section 5.1 is changed to Chapter 5<br>Section 5.2 is changed to Chapter 6<br>Chapter 6 to 11 are changed to Chapter 7 to 12 |
| Jul., 2009 | SH(NA)-080780ENG-C | Model Addition<br>Q00J, Q00, Q01<br><br>Addition<br>Chapter 4, Section 6.4, Section 6.5, Section 6.15, Section 9.5<br><br>Correction<br>MANUALS, GENERIC TERMS AND ABBREVIATIONS IN THIS MANUAL,<br>Section 1.2, Section 1.3, Section 2.1.1, Section 2.2, Section 2.2.3, Section 2.2.7,<br>Section 2.3.1, Section 3.1, Section 5.1, Section 5.2, Section 5.3, Section 5.4,<br>Section 5.5, Section 5.6.1, Section 5.7, Section 6.2.1, Section 6.2.4, Section 6.3.4,<br>Section 7.1, Section 7.2, Section 7.3, Section 7.4, Section 7.5, Section 7.8,<br>Section 7.9, Section 7.10, Section 7.11, Section 8.2, Chapter 10, Section 11.1,<br>Section 12.5, Section 13.2, Appendix 1<br>Chapter 4 to Chapter 12 are changed to Chapter 5 to Chapter 13<br>Section 5.4 to Section 5.12 are changed to Section 5.6 to Section 5.14<br><br>Deletion<br>Section 7.1.1, Section 7.1.2, Section 7.1.3, Section 7.1.5 |
| Oct.,2009 | SH(NA)-080780ENG-D | Correction<br>MANUALS, GENERIC TERMS AND ABBREVIATIONS IN THIS MANUAL,<br>Section 1.3.1, Section 5.1, Section 5.2, Section 5.3, Section 5.4, Section 6.4.5,<br>Section 13.1, Section 13.2, Appendix 1.2 |

| Print date | Manual number | Revision |
|---|---|---|
| Jan., 2010 | SH(NA)-080780ENG-E | Model Addition<br>L02, L26-BT<br><br>Addition<br>CONDITIONS OF USE FOR THE PRODUCT<br><br>Correction<br>MANUALS, GENERIC TERMS AND ABBREVIATIONS IN THIS MANUAL,<br>Section 1.2, Section 1.3, Section 2.1, Section 2.2.9, Section 4.1, Section 5.2,<br>Section 6.2.2, Section 6.3.2, Section 6.4, Section 6.10, Section 6.15, Section 7.9,<br>Section 7.11.2, Section 9.2.1, Section 9.4, Section 9.7, Section 10.2.1, Section 11.1,<br>Section 12.4, Chapter 13, Appendix 1 |
| Apr., 2010 | SH(NA)-080780ENG-F | Model Addition<br>Q50UDEH, Q100UDEH, LJ72GF15-T2<br><br>Addition<br>Section 2.3.3, Section 2.3.6, Section 7.2, Section 7.8.2, Section 7.8.3, Section 7.13,<br>Section 7.14<br><br>Correction<br>MANUALS, GENERIC TERMS AND ABBREVIATIONS IN THIS MANUAL,<br>Section 1.2, Section 1.3, Section 2.3.1, Section 5.2, Section 5.3, Section 5.4,<br>Section 5.5.2, Section 5.7, Section 6.15, Section 7.1, Section 7.3.1, Section 7.3.2,<br>Section 7.3.3, Section 7.3.4, Section 7.3.5, Section 7.3.6, Section 7.3.7, Section 7.3.8,<br>Section 7.3.9, Section 7.9, Section 8.2.5, Section 10.2.1, Section 10.2.2,<br>Section 10.2.5, Section 12.5.1, Section 13.2, Appendix 1.1, Appendix 1.2,<br>Appendix 1.6<br>Section 2.3.3 to Section 2.3.4 are changed to Section 2.3.4 to Section 2.3.5<br>Section 7.2 to Section 7.11 are changed to Section 7.3 to Section 7.12 |
| Sep., 2010 | SH(NA)-080780ENG-G | Addition<br>Section 5.8<br><br>Correction<br>Section 1.2, Section 1.3.1, Section 1.3.2, Section 1.3.3, Section 1.3.4, Section 2.1,<br>Section 5.2, Section 5.3, Section 5.4, Section 5.5.2, Section 5.7, Section 6.2.1,<br>Section 6.2.3, Section 6.2.4, Section 6.2.6, Section 6.3.6, Section 6.4.3, Section 6.4.5,<br>Section 6.15, Section 7.1, Section 7.9.2, Section 7.9.3, Section 7.12.2, Section 8.1.2,<br>Section 8.2.3, Section 9.3, Section 9.6.2, Section 10.2.1, Section 10.2.2,<br>Section 10.2.3, Section 10.2.5, Section 11.1, Section 12.5.1, Section 13.1.2,<br>Section 14.2, Appendix 1.2, Appendix 1.6 |

| Print date | Manual number | Revision |
|---|---|---|
| Jan., 2011 | SH(NA)-080780ENG-H | Addition<br>TERMS, Section 5.5.1, Section 5.5.2, Section 6.16<br><br>Correction<br>MANUALS, GENERIC TERMS AND ABBREVIATIONS IN THIS MANUAL,<br>Section 1.2, Section 1.3.1, Section 2.1, Section 2.2.6, Section 4.1, Section 5.1,<br>Section 5.2, Section 5.3, Section 5.4, Section 5.5.3, Section 5.6.1, Section 6.2.7,<br>Section 6.3.1, Section 6.3.3, Section 6.3.5, Section 6.4.2, Section 6.10.1, Section 7.1,<br>Section 7.3.7, Section 8.1.2, Section 10.2.1, Section 10.2.2, Section 12.4,<br>Section 13.1, Section 13.2, Appendix 1<br>Section 5.5.1 to Section 5.5.2 are changed to Section 5.5.3 to Section 5.5.4 |
| Mar., 2011 | SH(NA)-080780ENG-I | Addition<br>Section 10.3<br>Correction<br>MANUALS, Section 1.3.1, Section 1.3.3, Section 5.4, Section 5.5.2, Section 5.5.3,<br>Section 5.7, Section 5.7.1, Section 6.2.1, Section 6.3.6, Section 6.4.5, Section 7.13,<br>Section 10.2.1, Section 11.1, Section 13.2, Appendix 1, Appendix 1.1, Appendix 1.6<br>Section 10.3 is changed to Section 10.4 |
| Jul., 2011 | SH(NA)-080780ENG-J | Model Addition<br>L02-P, L26-PBT<br>Addition<br>Section 2.2.5, Section 6.1.2, Section 8.1.1, Section 8.2.2, Section 9.5, Appendix 1.2<br>Correction<br>GENERIC TERMS AND ABBREVIATIONS IN THIS MANUAL, Section 1.2,<br>Section 1.3.1, Section 1.3.2, Section 1.3.3, Section 2.1, Section 2.2.1, Section 2.2.6,<br>Section 2.2.8, Section 2.3.1, Section 4.1, Section 5.2, Section 5.3, Section 5.4,<br>Section 5.7.1, Section 6.1.1, Section 6.2.4, Section 6.2.6, Section 6.2.7, Section 6.4.1,<br>Section 6.4.2, Section 6.4.3, Section 6.4.4, Section 6.6.2, Section 6.8.2, Section 7.9.1,<br>Section 8.1, Section 9.2.1, Section 9.2.2, Section 9.2.3, Section 9.3, Section 9.5,<br>Section 10.2.1, Section 10.2.2, Section 10.3.3, Section 11.1, Section 12.1,<br>Section 12.5.1, Section 13.1, Section 13.2, Appendix 1<br>Section 2.2.6 to Section 2.2.9 are changed to Section 2.2.7 to Section 2.2.10<br>Section 8.1.1 to Section 8.1.2 are changed to Section 8.1.2 to Section 8.1.3<br>Section 8.2.2 to Section 8.2.5 are changed to Section 8.2.3 to Section 8.2.6<br>Section 9.6 to Section 9.7 are changed to Section 9.7 to Section 9.8<br>Section 10.2.5 is changed to Section 10.3.3<br>Section 12.3.3 is changed to Section 12.2.5<br>Appendix 1.2 to Appendix 1.8 are changed to Appendix 1.3 to Appendix 1.9 |
| Sep., 2011 | SH(NA)-080780ENG-K | Correction<br>Section 1.3.1, Section 2.2.5, Section 6.6.2, Section 6.8.2, Section 8.2.2 |
| | | |

Japanese Manual Version SH-080731-P

This manual confers no industrial property rights or any rights of any other kind, nor does it confer any patent licenses. Mitsubishi Electric Corporation cannot be held responsible for any problems involving industrial property rights which may occur as a result of using the contents noted in this manual.

© 2008 MITSUBISHI ELECTRIC CORPORATION

## INTRODUCTION

Thank you for purchasing the Mitsubishi integrated FA software, MELSOFT series.
Before using the product, thoroughly read this manual to develop full familiarity with the functions and performance to ensure correct use.

## CONTENTS


SAFETY PRECAUTIONS ..... A - 1
CONDITIONS OF USE FOR THE PRODUCT ..... A - 2
REVISIONS ..... A - 3
INTRODUCTION ..... A - 6
CONTENTS ..... A - 6
MANUALS ..... A - 12
GENERIC TERMS AND ABBREVIATIONS IN THIS MANUAL ..... A - 21
TERMS ..... A - 22

1 OVERVIEW 1 - 1 to 1 - 18

1.1 What is Simple Project? 1 - 2
1.2 Features of Simple Project 1 - 2
1.3 List of Functions 1 - 3
1.3.1 List of functions common to Simple project and Structured project ..... 1 - 3
1.3.2 List of functions for editing in ladder language ..... 1 - 14
1.3.3 List of functions for editing SFC diagrams ..... 1 - 17
1.3.4 List of functions for editing SFC block list ..... 1 - 18
1.3.5 List of functions for Structured project ..... 1 - 18

2 SCREEN CONFIGURATION 2 - 1 to 2 - 22

2.1 Overview of Screen Configuration 2 - 2
2.2 Ladder Editor 2 - 3
2.2.1 Editing screen ..... 2 - 3
2.2.2 Changing display size of editing screen ..... 2 - 5
2.2.3 Changing text size on editing screen ..... 2 - 6
2.2.4 Displaying/hiding comments ..... 2 - 6
2.2.5 Displaying/hiding lines of monitored current value ..... 2 - 7
2.2.6 Setting number of rows and columns for displaying comments ..... 2 - 8
2.2.7 Setting number of contacts to be displayed in ladder programs ..... 2 - 9
2.2.8 Switching display between label names and devices ..... 2 - 10
2.2.9 Hiding ladder blocks ..... 2 - 11
2.2.10 Displaying step ladder (STL) instruction in contact format ..... 2 - 13
2.3 SFC Editor 2 - 14
2.3.1 Editing screen ..... 2 - 14
2.3.2 Changing display size of editing screen ..... 2 - 18
2.3.3 Displaying MELSAP-L programs on SFC diagram ..... 2 - 19
2.3.4 Displaying/hiding SFC step/transition comments ..... 2 - 19
2.3.5 Setting number of columns for SFC diagram display ..... 2 - 20

2.3.6 Changing SFC display format ..... 2 - 20

3 PROGRAMMING PROCEDURE 3 - 1 to 3 - 4

3.1 Creating Programs 3 - 2

4 PROGRAM CONFIGURATIONS 4 - 1 to 4 - 4

4.1 Program Configurations of Simple Project 4 - 2

5 SETTING LABELS 5 - 1 to 5 - 32

5.1 Label Setting Screens 5 - 2
5.2 Setting Global Labels 5 - 3
5.3 Setting Local Labels for Programs 5 - 9
5.4 Setting Local Labels for Function Blocks 5 - 11
5.5 Common Operations for Setting Labels 5 - 13
5.5.1 Classes ..... 5 - 13
5.5.2 Data types ..... 5 - 14
5.5.3 Selecting data types ..... 5 - 15
5.5.4 Editing rows ..... 5 - 18
5.6 Setting Structured Data Type Labels 5 - 20
5.6.1 Setting data type of structure ..... 5 - 20
5.6.2 Setting data type as structure ..... 5 - 21
5.6.3 Assigning devices to structured data type labels ..... 5 - 21
5.6.4 Assigning devices to structure array type labels ..... 5 - 23
5.7 Setting Ranges for Devices Assigned Automatically 5 - 26
5.7.1 Precautions on automatically assigned devices ..... 5 - 27
5.8 Writing/Reading Data to/from CSV Files 5 - 29

6 EDITING LADDER PROGRAMS 6 - 1 to 6 - 66

6.1 Creating Ladders 6 - 2
6.1.1 Switching between overwrite mode and insert mode ..... 6 - 2
6.1.2 Switching between write mode and read mode ..... 6 - 3
6.2 Entering Instructions 6 - 6
6.2.1 Entering contacts, coils, and application instructions ..... 6 - 6
6.2.2 Instruction help ..... 6 - 11
6.2.3 Selecting the duplicated coil check function ..... 6 - 13
6.2.4 Entering device comments ..... 6 - 14
6.2.5 Entering pointer numbers and interrupt pointer numbers ..... 6 - 15
6.2.6 Opening label setting screen for program being edited ..... 6 - 16
6.2.7 Creating wrapping rows ..... 6 - 16
6.3 Using Function Blocks 6 - 18
6.3.1 Creating function blocks ..... 6 - 18

6.3.2 Pasting function blocks to sequence programs ... 6 - 19
6.3.3 Creating input and output ladder parts of function blocks ... 6 - 21
6.3.4 Changing FB instance names of pasted function blocks ... 6 - 22
6.3.5 Displaying function block ladder programs ... 6 - 23
6.3.6 Precautions on using function blocks ... 6 - 24
6.4 Using Inline Structured Text 6 - 26
6.4.1 Feature of Inline structured text ... 6 - 26
6.4.2 Inserting inline structured text box ... 6 - 27
6.4.3 Editing inline structured text program ... 6 - 28
6.4.4 Deleting inline structured text box ... 6 - 29
6.4.5 Precautions on using Inline structured text function ... 6 - 30
6.5 Moving Cursor to Start of Ladder Block 6 - 31
6.6 Drawing Lines 6 - 32
6.6.1 Drawing lines ... 6 - 32
6.6.2 Entering vertical or horizontal lines ... 6 - 33
6.7 Deleting Contacts, Coils, and Application Instructions 6 - 35
6.7.1 Deleting contacts, coils, and application instructions in unit of instruction ... 6 - 35
6.7.2 Deleting contacts, coils, and application instructions by setting a range ... 6 - 36
6.7.3 Deleting a ladder block ... 6 - 37
6.8 Deleting Lines 6 - 38
6.8.1 Deleting lines ... 6 - 38
6.8.2 Deleting vertical or horizontal lines ... 6 - 39
6.9 Inserting and Deleting Rows and Columns 6 - 41
6.9.1 Inserting rows ... 6 - 41
6.9.2 Deleting rows ... 6 - 42
6.9.3 Inserting columns ... 6 - 43
6.9.4 Deleting columns ... 6 - 44
6.10 Batch Inserting and Deleting NOP Instructions 6 - 45
6.10.1 Batch inserting NOP instructions ... 6 - 45
6.10.2 Batch deleting NOP instructions ... 6 - 46
6.11 Cutting, Copying, and Pasting Ladders 6 - 47
6.11.1 Pasting cut or copied ladders in unit of instruction ... 6 - 47
6.11.2 Pasting cut or copied ladders by setting a range ... 6 - 49
6.11.3 Pasting cut or copied ladder block ... 6 - 50
6.12 Canceling Previous Operation 6 - 53
6.12.1 Operation applicability ... 6 - 53
6.13 Restoring Ladders to the Status of After Conversion 6 - 54
6.14 Precautions on Editing Ladders 6 - 55
6.15 Changing T/C Setting Values 6 - 62
6.16 Setting Program Linkage Order (FXCPU) 6 - 64

7 EDITING SFC PROGRAMS 7 - 1 to 7 - 50

7.1 List of SFC Symbols 7 - 2

7.2 Difference between MELSAP3 and MELSAP-L 7 - 6
7.3 Creating SFC Diagrams 7 - 9
7.3.1 Entering SFC steps (□)/(▣)/(⊠) 7 - 10
7.3.2 Entering block start steps (⊟)/(⊟) 7 - 12
7.3.3 Entering series transitions ( ┼ ) 7 - 13
7.3.4 Entering selection divergences ( ) 7 - 15
7.3.5 Entering simultaneous divergences ( ) 7 - 16
7.3.6 Entering selection convergences ( ) 7 - 17
7.3.7 Entering simultaneous convergences ( ) 7 - 19
7.3.8 Entering jump transitions ( ) 7 - 22
7.3.9 Entering end steps ( ) 7 - 23
7.3.10 Drawing lines 7 - 24
7.3.11 Inserting/deleting rows and columns 7 - 25
7.4 Deleting SFC Diagrams 7 - 27
7.4.1 Deleting SFC symbols by setting a range 7 - 27
7.4.2 Deleting only divergence/convergence/vertical lines 7 - 28
7.5 Changing SFC Step Attributes 7 - 29
7.6 Cutting, copying, and pasting SFC diagrams 7 - 30
7.7 Sorting SFC Step/Transition Numbers of SFC Diagram 7 - 32
7.8 Redisplaying SFC Diagrams 7 - 33
7.9 Creating Operation Outputs and Transition Conditions 7 - 34
7.9.1 Creating operation output and transition condition programs (MELSAP3/FXCPU) 7 - 34
7.9.2 Creating operation output and transition condition programs (MELSAP-L (instruction format)) 7 - 36
7.9.3 Creating operation output and transition condition programs (MELSAP-L (start conditions format)) 7 - 39
7.10 Setting Block Information 7 - 41
7.11 Displaying SFC Block List 7 - 42
7.11.1 Displaying comments on SFC block list 7 - 43
7.11.2 Displaying devices on SFC block list 7 - 43
7.11.3 Displaying SFC diagram from SFC block list 7 - 44
7.11.4 Displaying Local Label Setting screen from SFC block list 7 - 44
7.12 Setting Parameters for SFC Programs 7 - 45
7.12.1 SFC settings in PLC parameter 7 - 45
7.12.2 Setting the property of SFC programs 7 - 46
7.13 Precautions on Creating Programs in MELSAP-L 7 - 48
7.14 Changing T/C Setting Values 7 - 50

8 SEARCH AND REPLACE 8 - 1 to 8 - 12

8.1 Searching for and Replacing Data in Ladder Programs 8 - 2
8.1.1 Searching for devices/labels 8 - 2
8.1.2 Jumping to the specified step number 8 - 3
8.1.3 Changing the module start I/O numbers 8 - 4
8.2 Searching for and Replacing Data in SFC Programs 8 - 6

8.2.1 Jumping to specified SFC step number/transition number on SFC diagram ..... 8 - 6
8.2.2 Searching for jump with step number on SFC diagram ..... 8 - 7
8.2.3 Jumping to specified SFC step number/block number on SFC diagram ..... 8 - 8
8.2.4 Replacing SFC step number on SFC diagram ..... 8 - 9
8.2.5 Searching for blocks on SFC block list ..... 8 - 10
8.2.6 Searching for devices on SFC block list ..... 8 - 11

9 EDITING COMMENTS/STATEMENTS/NOTES 9 - 1 to 9 - 30

9.1 Editing Device Comments 9 - 2
9.2 Editing Statements and Notes 9 - 2
9.2.1 Statements and notes ..... 9 - 2
9.2.2 Entering statements ..... 9 - 4
9.2.3 Modifying and deleting statements ..... 9 - 7
9.2.4 Entering notes ..... 9 - 9
9.2.5 Modifying and deleting notes ..... 9 - 11
9.3 Batch Editing Statements and Notes 9 - 13
9.4 Changing the Type (PLC/Peripheral) of Statement/Note 9 - 21
9.5 Displaying Line Statements on Tree View 9 - 22
9.5.1 Line statements on tree view ..... 9 - 22
9.5.2 Displaying line statements on tree view ..... 9 - 23
9.5.3 Disabling setting of line statements on tree view ..... 9 - 24
9.5.4 Moving ladder blocks on tree view ..... 9 - 25
9.5.5 Deleting ladder blocks on tree view ..... 9 - 26
9.6 Jumping from Line Statement List 9 - 27
9.7 Merge Process when Reading Programs from Programmable Controller CPU 9 - 28
9.7.1 Merge process ..... 9 - 28
9.7.2 Performing merge process ..... 9 - 29
9.8 Editing SFC Comments 9 - 30

10 CONVERTING/COMPILING PROGRAMS 10 - 1 to 10 - 20

10.1 For Projects without Labels 10 - 2
10.1.1 Converting created programs ..... 10 - 2
10.1.2 Converting all programs ..... 10 - 2
10.1.3 Executing online program change simultaneously with ladder conversion ..... 10 - 2
10.1.4 Checking programs ..... 10 - 3
10.2 For Projects with Labels 10 - 5
10.2.1 Converting/compiling created programs ..... 10 - 5
10.2.2 Compiling all programs ..... 10 - 7
10.2.3 Executing online program change simultaneously with conversion/compilation ..... 10 - 7
10.2.4 Changing operating conditions of compilation ..... 10 - 8
10.3 Compilation 10 - 10
10.3.1 Compilation target data when compiling all programs ..... 10 - 10
10.3.2 Assigning devices ..... 10 - 11
10.3.3 Precautions on compilation ..... 10 - 14

10.4 Checking for Errors and Warnings 10 - 18
10.4.1 Correcting errors and warnings ..... 10 - 19

11 WRITING/READING DATA TO/FROM PROGRAMMABLE CONTROLLER CPU 11 - 1 to 11 - 6

11.1 Writing/Reading Data to/from Programmable Controller CPU 11 - 2

12 MONITORING 12 - 1 to 12 - 16

12.1 Starting and Stopping Monitoring of Programs 12 - 2
12.2 Starting and Stopping Monitoring of Function Blocks 12 - 3
12.3 Changing Operating Conditions of Monitoring 12 - 4
12.3.1 Changing current value display format (decimal/hexadecimal) of word type variable ..... 12 - 4
12.3.2 Monitoring buffer memory and link memory ..... 12 - 5
12.3.3 Switching to FXGP(DOS)/FXGP(WIN) display format (FXCPU) ..... 12 - 6
12.4 Monitoring Ladder Programs 12 - 7
12.5 Monitoring SFC Programs 12 - 8
12.5.1 Monitoring SFC diagrams ..... 12 - 8
12.5.2 Monitoring transitions ..... 12 - 11
12.5.3 Monitoring operation outputs and transition conditions ..... 12 - 12
12.5.4 Batch monitoring all blocks, monitoring active steps ..... 12 - 13
12.5.5 Monitoring SFC block list ..... 12 - 15

13 SETTING OPTIONS 13 - 1 to 13 - 6

13.1 Basic Operations 13 - 2
13.2 Option Setting List 13 - 3

APPENDIX App - 1 to App - 16

Appendix 1 List of Toolbars and Shortcut Keys App - 2
Appendix 1.1 Common toolbars and shortcut keys ..... App - 2
Appendix 1.2 "Navigation Window" toolbar icons ..... App - 6
Appendix 1.3 Toolbar icons and shortcut keys for setting labels ..... App - 7
Appendix 1.4 Toolbar icons and shortcut keys for setting device memory ..... App - 8
Appendix 1.5 Toolbar icons and shortcut keys for verification result ..... App - 9
Appendix 1.6 Toolbar icons for executing sampling trace ..... App - 9
Appendix 1.7 Toolbar icons and shortcut keys for program editors ..... App - 10
Appendix 1.8 Toolbar icons and shortcut keys for I/O system setting function ..... App - 15
Appendix 1.9 Shortcut keys for operating intelligent function module ..... App - 16

INDEX INDEX - 1 to INDEX - 5

## ■ MANUALS

Related manuals are separately issued according to the purpose of their functions in GX Works2.

● Related manuals

The manuals related to this product are shown below.
Refer to the following tables when ordering required manuals.

1) Operation of GX Works2

| Manual name | Manual number (Model code) |
|---|---|
| GX Works2 Version 1 Operating Manual (Common)<br>Explains the system configuration of GX Works2 and the functions common to Simple project and Structured project such as parameter setting, operation method for the online function. (Sold separately) | SH-080779ENG (13JU63) |
| GX Works2 Version 1 Operating Manual (Structured Project)<br>Explains operation methods such as creating and monitoring programs in Structured project of GX Works2. (Sold separately) | SH-080781ENG (13JU65) |
| GX Works2 Version 1 Operating Manual (Intelligent Function Module)<br>Explains operation methods of intelligent function module such as parameter setting, monitoring programs, and predefined protocol support function in GX Works2. (Sold separately) | SH-080921ENG (13JU69) |
| GX Works2 Beginner's Manual (Simple Project)<br>Explains fundamental operation methods such as creating, editing, and monitoring programs in Simple project for users inexperienced with GX Works2. (Sold separately) | SH-080787ENG (13JZ22) |
| GX Works2 Beginner's Manual (Structured Project)<br>Explains fundamental operation methods such as creating, editing, and monitoring programs in Structured project for users inexperienced with GX Works2. (Sold separately) | SH-080788ENG (13JZ23) |

2) Structured Programming

| Manual name | Manual number (Model code) |
|---|---|
| MELSEC-Q/L/F Structured Programming Manual (Fundamentals)<br>Explains the programming methods, types of programming languages, and other information required to create structured programs. (Sold separately) | SH-080782ENG (13JW06) |
| MELSEC-Q/L Structured Programming Manual (Common Instructions)<br>Explains the specifications and functions of common instructions such as sequence instructions, basic instructions, and application instructions, that can be used in structured programs. (Sold separately) | SH-080783ENG (13JW07) |
| MELSEC-Q/L Structured Programming Manual (Application Functions)<br>Explains the specifications and functions of application functions that can be used in structured programs. (Sold separately) | SH-080784ENG (13JW08) |
| MELSEC-Q/L Structured Programming Manual (Special Instructions)<br>Explains the specifications and functions of special instructions such as module dedicated instruction, PID control instruction, and built-in I/O function dedicated instruction, that can be used in structured programs. (Sold separately) | SH-080785ENG (13JW09) |
| FXCPU Structured Programming Manual (Device & Common)<br>Explains the devices and parameters provided in GX Works2 for structured programming. (Sold separately) | JY997D26001 (09R925) |
| FXCPU Structured Programming Manual (Basic & Applied Instruction)<br>Explains the sequence instructions provided in GX Works2 for structured programming.(Sold separately) | JY997D34701 (09R926) |
| FXCPU Structured Programming Manual (Application Functions)<br>Explains the application functions provided in GX Works2 for structured programming. (Sold separately) | JY997D34801 (09R927) |

3) Operation of iQ Works

| Manual name | Manual number (Model code) |
|---|---|
| iQ Works Beginner's Manual<br>Explains fundamental operation methods such as managing the system using MELSOFT Navigator and using system labels for users inexperienced with GX Works2. (Sold separately) | SH-080902ENG (13JZ44) |

**Point**

**The Operating Manuals are included on the CD-ROM of the software package in a PDF file format. Manuals in printed form are sold separately for single purchase. Order a manual by quoting the manual number (model code) listed in the table above.**

● Purpose of this manual

This manual explains the operations for creating sequence programs in Simple project using the functions supported by GX Works2.
Manuals for reference are listed in the following table according to their purpose.
For information such as the contents and number of each manual, refer to the list of 'Related manuals'.

1) Operation of GX Works2

| Purpose | | GX Works2 Installation Instructions | GX Works2 Beginner's Manual | | GX Works2 Version 1 Operating Manual | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Simple Project | Structured Project | Common | Simple Project | Structured Project | Intelligent Function Module |
| Installation | Learning the operating environment and installation method |  | | | | | | |
| | Learning a USB driver installation method | | | |  | | | |
| Operation of GX Works2 | Learning all functions of GX Works2 | | | |  | | | |
| | Learning the project types and available languages in GX Works2 | | | |  | | | |
| | Learning the basic operations and operating procedures when creating a simple project for the first time | |  | | | | | |
| | Learning the basic operations and operating procedures when creating a structured project for the first time | | |  | | | | |
| | Learning the operations of available functions regardless of project type. | | | |  | | | |
| | Learning the functions and operation methods for programming | | | |  |  |  | |
| | Learning data setting methods for intelligent function module | | | | | | |  |

2) Operations in each programming language

For details of instructions used in each programming language, refer to the section 3 on the next page.

| Purpose | | GX Works2 Beginner's Manual | | GX Works2 Version 1 Operating Manual | |
|---|---|---|---|---|---|
| | | Simple Project | Structured Project | Simple Project | Structured Project |
| Simple Project | Ladder | Outline | | Details | |
| | SFC | *1 Outline | | Details | |
| | ST | | Outline | | Details |
| Structured Project | Ladder | Outline | | Details | |
| | SFC | *1 Outline | | Details | |
| | Structured ladder /FBD | | Outline | | Details |
| | ST | | Outline | | Details |

*1: MELSAP3 and FX series SFC only

3) Details of instructions in each programming language (for QCPU (Q mode)/LCPU)

| Purpose | | MELSEC-Q/L/F Structured Programming Manual | MELSEC-Q/L Structured Programming Manual | | | MELSEC-Q/L Programming Manual | MELSEC-Q/L/QnA Programming Manual | | Manual for module to be used |
|---|---|---|---|---|---|---|---|---|---|
| | | Fundamentals | Common Instructions | Special Instructions | Application Functions | Common Instructions | PID Control Instructions | SFC | – |
| All languages | Learning details of programmable controller CPU error codes, special relays, and special registers | | | | | Details | | | |
| Using ladder language | Learning the types and details of common instructions | | | | | Details | | | |
| | Learning the types and details of instructions for intelligent function modules | | | | | | | | Details |
| | Learning the types and details of instructions for network modules | | | | | | | | Details |
| | Learning the types and details of instructions for the PID control function | | | | | | Details | | |
| Using SFC language | Learning details of specifications, functions, and instructions of SFC (MELSAP3) | | | | | | | Details | |
| Using structured ladder/FBD or ST language | Learning the fundamentals for creating a structured program | Details | | | | | | | |
| | Learning the types and details of common instructions | | Details | | | | | | |
| | Learning the types and details of instructions for intelligent function modules | | | Outline | | | | | Details |
| | Learning the types and details of instructions for network modules | | | Outline | | | | | Details |
| | Learning the types and details of instructions for the PID control function | | | Outline | | | Details | | |
| | Learning the types and details of application functions | | | | Details | | | | |

4) Details of instructions in each programming language (for FXCPU)

| Purpose | | MELSEC-Q/L/F Structured Programming Manual | FXCPU Structured Programming Manual | | | FXCPU Programming Manual | | |
|---|---|---|---|---|---|---|---|---|
| | | Fundamentals | Device & Common | Basic & Applied Instruction | Application Functions | FX0, FX0S, FX0N, FX1, FXU, FX2C | FX1S, FX1N, FX2N, FX1NC, FX2NC | FX3G, FX3U, FX3UC |
| Using ladder language | Learning the types and details of basic/ application instructions, descriptions of devices and parameters | | | | | Details | Details | Details |
| Using SFC language | Learning details of specifications, functions, and instructions of SFC | | | | | Details | Details | Details |
| Using structured ladder/FBD or ST language | Learning the fundamentals for creating a structured program | Details | | | | | | |
| | Learning the descriptions of devices, parameters, and error codes | | Details | | | | | |
| | Learning the types and details of sequence instructions | | | Details | | | | |
| | Learning the types and details of application instructions | | | | Details | | | |

● How to read this manual

**Supported CPU**

Supported programmable controller CPUs are shown in icons under the section title.

**Screen display**

Describes the screen display procedure.
Follow the ⇒and select [(menu)] to open the screen.
*Screen display may depend on the CPU.
In that case, typical example is described.

**Chapter heading**

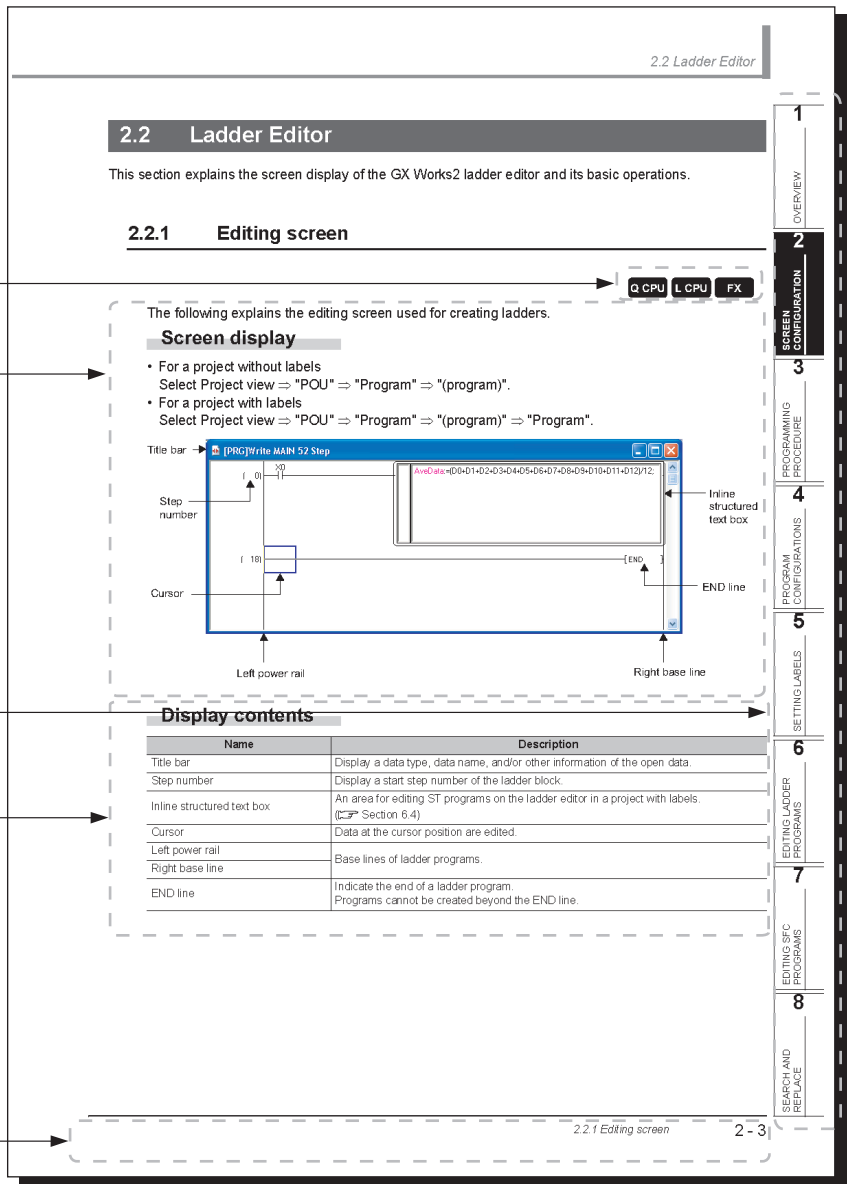
Index on the right of the page number clarifies the chapter of currently open page.

**Display contents**

Describes the display contents in the screen.

**Section title**

Clarifies the section of currently open page.




**Operating procedure**

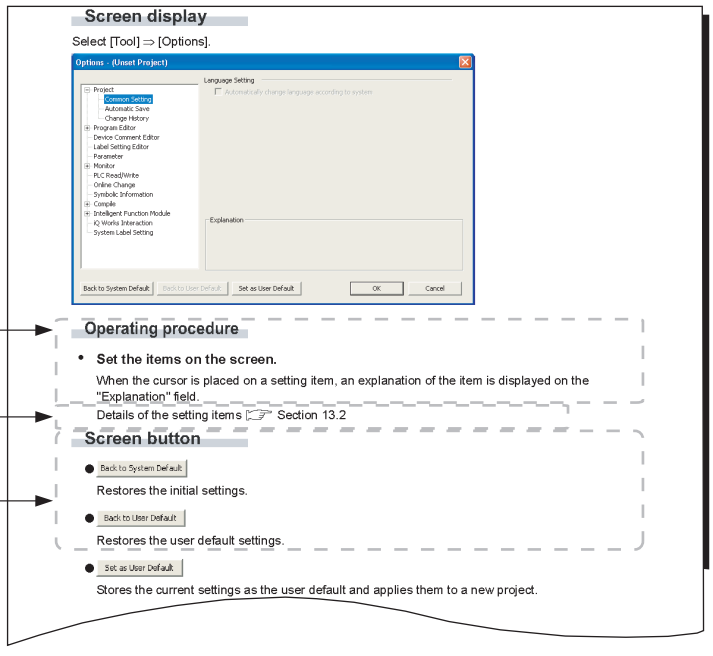
Describes the operating procedure of the function.

**Reference location**

☞ leads to the reference location and reference manual.

**Screen button**

Describes the buttons in the screen.



The following table explains the CPU module icons that indicate the function availability.

| Icon | | | Description |
|---|---|---|---|
| QCPU (Q mode) | LCPU | FXCPU | |
| Q CPU | L CPU | FX | Normal icons indicate that the corresponding function is available. |
| *1 Q CPU | - | - | Icons with * (asterisk) symbol indicate that the corresponding function is available with restrictions such as CPU types. |
| Q CPU | L CPU | FX | Icons with × symbol indicate that the corresponding function is not available. |

This manual also uses the following columns:

**Point**

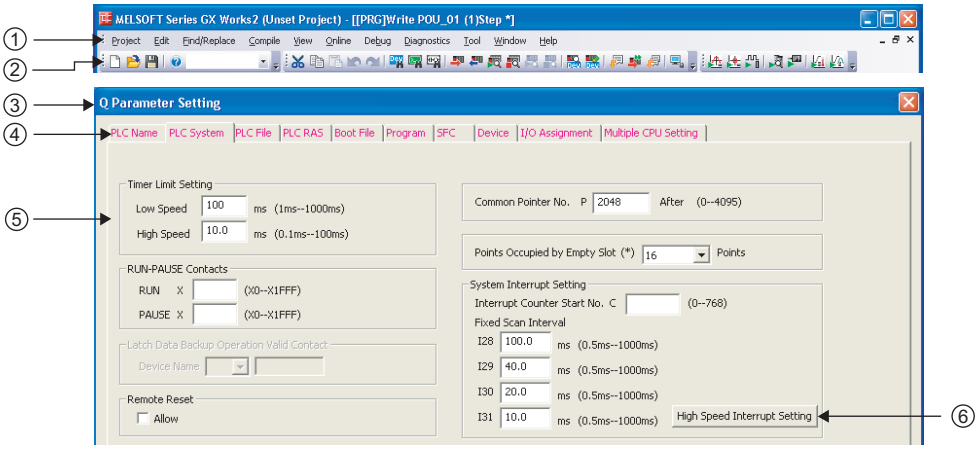
This explains notes requiring attention or useful functions relating to the information given on the same page.

**Restrictions**

This explains restrictions relating to the information given on the same page.

● Symbols used in this manual

The following shows the symbols used in this manual with descriptions and examples.




| No. | Symbol | Description | Example |
|---|---|---|---|
| ① | [ ] | Menu name on a menu bar | [Project] |
| ② |  | Toolbar icon |  |
| ③ | (Underline) | Screen name | Q Parameter Setting screen |
| ④ | 《 》 | Tab name in a screen | <<PLC System>> |
| ⑤ | " " | Item name in a screen | "Timer Limit Setting" |
| ⑥ |  | Button on a screen |  button |
| – |  | Keyboard key |  |

## ■ GENERIC TERMS AND ABBREVIATIONS IN THIS MANUAL

This manual uses the generic terms and abbreviations listed in the following table to discuss the software packages and programmable controller CPUs. Corresponding module models are also listed if needed.

| Generic term and abbreviation | Description |
|---|---|
| GX Works2 | Generic product name for SWnDNC-GXW2-E<br>(n: version) |
| GX Developer | Generic product name for SWnD5C-GPPW-E, SWnD5C-GPPW-EA, SWnD5C-GPPW-EV, and SWnD5C-GPPW-EVA<br>(n: version) |
| MELSOFT Navigator | Product name for the integrated development environment included in SWnDNC-IQWK (iQ Platform compatible engineering environment MELSOFT iQ Works)<br>(n: version) |
| iQ Works | Abbreviation for iQ platform supporting engineering environment MELSOFT iQ Works |
| Personal computer | Generic term for personal computers on which Windows® operates |
| Basic model QCPU | Generic term for Q00J, Q00, and Q01 |
| High Performance model QCPU | Generic term for Q02, Q02H, Q06H, Q12H, and Q25H |
| Universal model QCPU | Generic term for Q00UJ, Q00U, Q01U, Q02U, Q03UD, Q03UDE, Q04UDH, Q04UDEH, Q06UDH, Q06UDEH, Q10UDH, Q10UDEH, Q13UDH, Q13UDEH, Q20UDH, Q20UDEH, Q26UDH, Q26UDEH, Q50UDEH, and Q100UDEH |
| Built-in Ethernet port QCPU | Generic term for Q03UDE, Q04UDEH, Q06UDEH, Q10UDEH, Q13UDEH, Q20UDEH, Q26UDEH, Q50UDEH, and Q100UDEH |
| QCPU (Q mode) | Generic term for Basic model QCPU, High Performance model QCPU, and Universal model QCPU |
| LCPU | Generic term for L02, L02-P, L26-BT, and L26-PBT |
| FXCPU | Generic term for FX0, FX0S, FX0N, FX1, FXU, FX2C, FX1S, FX1N, FX1NC, FX2N, FX2NC, FX3G, FX3U, and FX3UC |
| FXGP(WIN) | Abbreviation for SW0PC-FXGP/WIN-E |
| MELSAP3 | Abbreviation for the SFC function in MELSAP3 display format |
| MELSAP-L | Generic term for the SFC function in MELSAP-L (instruction format) and MELSAP-L (start conditions format) |
| SFC | Generic term for MELSAP3, MELSAP-L, and FX series SFC |

## ■ TERMS

The following are the terms used in this manual.

| Term | | Description |
|---|---|---|
| Execution program | | A compiled program created in a project with labels<br>A program that can be executed in a programmable controller CPU |
| Actual device | | An actual device assigned to label after compiling a project with labels, or a device that is not described using a label |
| Common instruction | | Generic term for sequence instructions, basic instructions, application instructions, data link instructions, multiple CPU dedicated instructions, and multiple CPU high-speed transmission dedicated instructions |
| Special instruction | | Generic term for module dedicated instructions, PID control instructions, socket communication function instructions, built-in I/O function instructions, and data logging function instructions |
| Simple project | | Generic term for projects created using the ladder/SFC/ST language |
| | Without labels | Generic term for projects created without selecting "Use Label" when creating new projects |
| | With labels | Generic term for projects created with selecting "Use Label" when creating new projects |
| Structured project | | Generic term for projects created using the ladder/SFC/ST/structured ladder/FBD language |
| Project without labels | | Generic term for Simple projects that do not use labels |
| Project with labels | | Generic term for Simple projects that use labels and Structured projects |
| Project with security | | Generic term for projects whose securities are set |
| List format | | An input format to input mnemonic language in a ladder program |

# 1 OVERVIEW

This manual describes the programming method using Simple project and the operation method of the related functions.
For the features and functions of GX Works2, refer to the following manual.
☞GX Works2 Version 1 Operating Manual (Common)


**1.1 What is Simple Project? . . . . . 1-2**
**1.2 Features of Simple Project . . . . . 1-2**
**1.3 List of Functions . . . . . 1-3**

# 1.1 What is Simple Project?

The Simple project is used to create sequence programs using instructions for Mitsubishi programmable controller CPUs.
Programs in Simple project can be created in a similar way with the existing GX Developer.

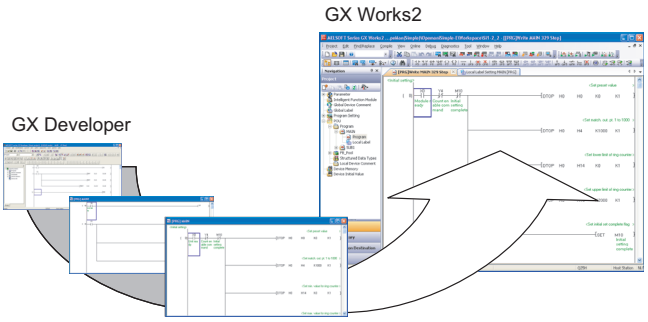
# 1.2 Features of Simple Project

The features of the Simple project are as follows.

## ■ Inheritance of operational performances and enhanced use of program assets

GX Works2 inherits excellent operational performances from the existing GX Developer.

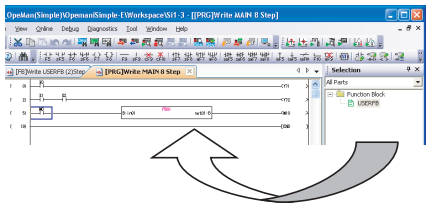
Therefore, GX Works2 can edit the sequence programs created by the existing GX Developer, making it possible to utilize program assets effectively.




## ■ Program components using function blocks

The function blocks can be used to convert and register ladder blocks that are used repeatedly as components.
Therefore, registered ladder blocks can be easily utilized when creating sequence programs.

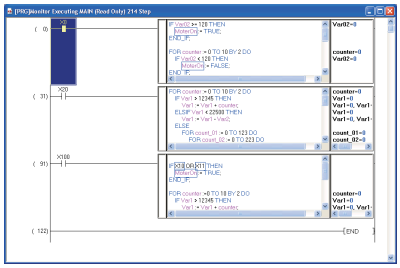
Function blocks can be used only for a project with labels.



## ■ ST program editing on ladder editor

ST programs can be edited/monitored on the ladder editor by using the Inline structured text function.

The Inline structured text function can be used only for a project with labels.



# 1.3 List of Functions

This section shows the list of functions of GX Works2.
The functions are divided into common functions available (Project, Online, Debug, Diagnostics, Tool, Window, and Help) and functions used for each editing and setting target (Edit, Find/Replace, Compile, and View).
For (Common), (Structured), and (Intelligent) indicated in the Reference column, refer to the following manuals respectively:
(Common) ..... GX Works2 Version 1 Operating Manual (Common)
(Structured) ..... GX Works2 Version 1 Operating Manual (Structured Project)
(Intelligent) ..... GX Works2 Version 1 Operating Manual (Intelligent Function Module)

## 1.3.1 List of functions common to Simple project and Structured project

This section explains the functions common to Simple project and Structured project.

### ■ List of common functions

The following tables show functions that are available regardless of the type of editing or setting target.

| Project (common function) | | | Reference |
|---|---|---|---|
| New | | Create a new project. | (Common) |
| Open | | Open an existing project. | |
| Close | | Close an open project. | |
| Save | | Save a project. | |
| Save As | | Name and save a project. | |
| Compress/Unpack | | | |
| | Compress | Compress and save a project. | |
| | Unpack | Unpack a compressed project. | |
| Delete | | Delete an existing project. | |
| Verify | | Verify between two project data. | |
| Project Revision | | | – |
| | Revision Entry | Register the project change history. | (Common) |
| | Revision List | Display the list of project change history. | |
| Change PLC Type | | Change the programmable controller CPU type. | |
| Change Project Type | | Change the project type from Simple project (without labels) to Simple project (with labels), or from Simple project (with labels) to Structured project. | |
| Object | | | – |
| | New | Add data to a project. | (Common) |
| | Rename | Rename the selected data. | |
| | Delete | Delete the selected data. | |
| | Copy | Copy the selected data. | |
| | Paste | Paste the copied data. | |
| | Set as Default Connection | Specify data in selected connection target as a connection target for regular use. | |
| | Property | Display the selected data properties. | |

| Project (common function) | | | Reference |
|---|---|---|---|
| Intelligent Function Module | | | – |
| | New Module | Add new intelligent function module data. | (Intelligent) |
| | Delete Module | Delete intelligent function module data. | |
| | Property | Display properties of an intelligent function module data. | |
| | Save the Positioning Module Data | Save data of the positioning module selected on the Project view to a file. | |
| | Read from the Positioning Module Data | Read data from the positioning module and reflect it to the positioning module selected on the Project view. | |
| | Intelligent Function Module Parameter List | Display a list of set/unset parameters of an intelligent function module. | |
| Open Other Data | | | – |
| | Open Other Project | Open a project created with GX Developer. | (Common) |
| | Read ASC Format File | Read an ASC format file. | |
| | Import GX Configurator-QP Data | Read a project created with GX Configurator-QP. | (Intelligent) |
| Export to GX Developer Format File | | Save an open project in GX Developer format. | (Common) |
| Library | | | – |
| | Create | Create a new library. | (Structured) |
| | Install | Import a created library to the project. | |
| | Deinstall | Delete a library from the project. | |
| | Reload | Update the library imported to the project. | |
| | Rename | Rename a library. | |
| | Open | Enable editing of a library. | |
| | Close | Disable editing of a library. | |
| | Change Password | Set a password for a library. | |
| | Save As | Name and save a project. | |
| | Save | Save a library file. | |
| | Help | Display help information of the library. | |
| Security | | | – |
| | Change Password | Change the password of the current login user. | (Common) |
| | User Management | Manage user information of the project.<br>Add/delete a user or change the user information. | |
| | Data Security Setting | Set the access authorization of each user related to reading/writing data. | |
| Print | | Batch print multiple data in the project. | |
| Print Preview | | Display a print preview of data to be batch printed. | |
| Print Window | | Print the open screen. | |
| Print Window Preview | | Display the print preview of the open screen. | |
| Printer Setup | | Change the printer settings. | |
| (Recently used files 1 to 4) | | Display the recently used GX Works2 project paths and open the selected project. | |
| Start GX Developer | | Start GX Developer from GX Works2. | |
| Exit | | Exit GX Works2. | |

| Edit (common function) | | Reference |
|---|---|---|
| Undo | Restore the previous processing status. | – |
| Redo | Restore the processing deleted with [Undo]. | |
| Cut | Cut the selected data. | |
| Copy | Copy the selected data. | |
| Paste | Paste the cut or copied data at the cursor position. | |

| Find/Replace (common function) | | Reference |
|---|---|---|
| Cross Reference | Display the usage of selected device or label. | (Common) |
| Device List | Display the usage of devices. | |
| Find Device | Search a device/label in the program. | |
| Find Instruction | Search an instruction. | |
| Find Contact or Coil | Search a contact or coil corresponding to the specified device. | |
| Find String | Search a string. | |
| Replace Device | Replace a device/label in the program. | |
| Replace Instruction | Replace an instruction. | |
| Replace String | Replace a string. | |
| Change Open/Close Contact | Change an open contact to a closed contact, or change a closed contact to an open contact. | |
| Device Batch Replace | Batch-replace devices with the specified device. | |
| Register to Device Batch Replace | Register selected devices on the Device Batch Replace screen. | |

| Compile (common function) | | Reference |
|---|---|---|
| Build | Convert/compile a program being edited. | Section 10.2.1 |
| Online Program Change | Write sequence programs to a programmable controller CPU after the conversion/compilation. | Section 10.2.3 |
| Rebuild All | Convert/compile all programs in the project. | Section 10.2.2 |

| View (common function) | | Reference |
|---|---|---|
| Toolbar | | – |
| Toolbar name | Display/hide each toolbar. | (Common) |
| Statusbar | Display/hide the status bar. | |
| Color and Font | Set the display color for characters such as labels, device comments on the work window. | |
| Docking Window | | – |
| Navigation Window | Display/hide the Navigation window. | (Common) |
| Function Block Selection Window | Display/hide the Function Block Selection window.<br>Select a part such as FB or function on the window for utilizing it to a program. | Section 6.3 |
| Output Window | Display/hide the Output window.<br>In the Output window, the conversion (compilation) result is displayed. | Section 10.4 |
| Cross Reference | Display/hide the Cross Reference window.<br>In the Cross Reference window, devices/labels used in the project are displayed. | (Common) |
| Device List | Display/hide the Device List window.<br>In the Device List window, the usage of selected device is displayed. | |
| Watch 1 to 4 | Display/hide the Watch window.<br>In the Watch window, the monitoring result is displayed. | |
| Intelligent Function Module Monitor | | – |
| Intelligent Function Module Monitor 1 to 10 | Display/hide the Intelligent Function Module Monitor window. | (Intelligent) |
| Intelligent Function Module Guidance | Display/hide the Intelligent Function Module Guidance window. | |
| Find/Replace | Display/hide the Find/Replace window.<br>In the Find/Replace window, the search/replace result is displayed. | (Common) |
| Debug Window | | – |
| Break Point Window | Display/hide the Break Point window. | (Common) |
| Break Device Window | Display/hide the Break Device window. | |
| Skip Range Window | Display/hide the Skip Range window. | |

| Online (common function) | | | Reference |
|---|---|---|---|
| Read from PLC | | Read data from the programmable controller CPU. | Section 11.1 |
| Write to PLC | | Write data to the programmable controller CPU. | |
| Verify with PLC | | Verify a project being edited against the data in the programmable controller CPU. | (Common) |
| Remote Operation | | Remotely control RUN/PAUSE/STOP of the programmable controller CPU from GX Works2. | |
| Password/Keyword | | | – |
| | New | Set a password/keyword to the programmable controller CPU. | (Common) |
| | Delete | Cancel the password/keyword set to the programmable controller CPU. | |
| | Disable | Temporarily unlock the password/keyword set to the programmable controller CPU. | |
| PLC Memory Operation | | | – |
| | Format PLC Memory | Format the programmable controller CPU memory. | (Common) |
| | Clear PLC Memory | Clear the programmable controller CPU memory. | |
| | Arrange PLC Memory | Arrange the programmable controller CPU memory. | |
| Delete PLC Data | | Delete data in the programmable controller CPU. | |
| PLC User Data | | | – |
| | Read PLC User Data | Read the programmable controller CPU user data. | (Common) |
| | Write PLC User Data | Write the programmable controller CPU user data. | |
| | Delete PLC User Data | Delete the programmable controller CPU user data. | |
| Export to ROM Format | | Copy the program memory data in the programmable controller CPU to ROM. | |
| Program Memory Batch Download | | Transfer the content of program cache memory to program memory in batch. | |
| Latch Data Backup | | | – |
| | Backup | Back up device memory/file register/error history data to the standard ROM. | (Common) |
| | Delete Backup Data | Delete the backup data in the programmable controller CPU. | |
| PLC Module Change | | | – |
| | Create Backup Data | Back up data in the programmable controller CPU to the memory card. | (Common) |
| | Restore | Restore the backup data to another programmable controller CPU. | |
| Set Clock | | Set the clock in the programmable controller CPU. | |
| Register/Cancel Display Module Menu | | Register/cancel menus to operate intelligent function module using the LCPU display module menu. | |

| Online (common function) | | | Reference |
|---|---|---|---|
| Monitor | | | – |
| | Monitor Mode | Switch the mode of the open window to "Monitor Mode" during monitoring. | Section 6.1.2 |
| | Monitor (Write Mode) | Switch the mode of the open window to "Monitor (Write Mode)" during monitoring. | |
| | Start Monitoring (All Windows) | Start monitoring of all open windows. | (Common) |
| | Stop Monitoring (All Windows) | Stop monitoring of all open windows. | |
| | Start Monitoring | Start monitoring of the open window. | Section 12.1 |
| | Stop Monitoring | Stop monitoring of the open window. | |
| | Change Value Format (Decimal) | Display the current device value in decimal in program monitoring. | Section 12.3.1 |
| | Change Value Format (Hexadecimal) | Display the current device value in hexadecimal in program monitoring. | |
| | Device/Buffer Memory Batch | Monitor device/buffer memory in batch. | (Common) |
| | Program List | Monitor the processing time of programs being executed. | |
| | Interrupt Program List | Monitor the number executions of interrupt programs. | |
| | Change Instance (Function Block) | Select an instance of the function block to be monitored. | Section 12.2 |
| | SFC All Block Batch Monitoring | Batch monitor all blocks in the SFC program. | Section 12.5.4 |
| | SFC Auto Scroll | Scroll the screen to display active steps automatically when they are out of the screen during monitoring. | Section 12.5.1 |
| Watch | | | – |
| | Start Watching | Start monitoring the current values of registered devices/ labels and intelligent function module. | (Common) |
| | Stop Watching | Stop monitoring the current values of registered devices/ labels and intelligent function module. | |
| | Register Watch | Register the selected devices/labels to the Watch window. | |
| Local Device Batch Read + Save CSV | | Read local device data from the programmable controller CPU and saves them to a personal computer in CSV format. | |

| Debug (common function) | | | Reference |
|---|---|---|---|
| Start/Stop Simulation | | Start/stop simulation. | (Common) |
| Instructions Unsupported by Simulation | | Display a list of the instructions and devices used in the program unsupported by the simulation function. | |
| Modify Value | | For ladder and SFC (Zoom) programs, change the ON/OFF status and values of devices and labels used in the program. | |
| Forced Input Output Registration/ Cancellation | | Register/cancel the forced input/output of the device 'X'/'Y'. | |
| Device Test with Execution Condition | | | – |
| | Register Device Test with Execution Condition | Register the device test with execution condition. | (Common) |
| | Check/Disable Register Device Test with Execution Condition | Check/disable the registration of device test with execution condition. | |
| | Batch Disable Device Test with Execution Condition | Cancel the device test with execution condition in batch. | |
| Sampling Trace | | | – |
| | Open Sampling Trace | Display the Sampling Trace screen. | (Common) |
| Scan Time Measurement | | Measure the scan time of a desired section. | |

| Debug (common function) | | | Reference |
|---|---|---|---|
| Step Execution | | | – |
| | Stop | Stop the step execution. | (Common) |
| | Cancel | Cancel the step execution. | |
| | Break Execution | Execute the break execution. | |
| | Step Execution | Execute the step execution. | |
| | Execution Option | Display the "Execution Option" screen of the step execution. | |
| Break Setting | | | – |
| | Set/Cancel Break Point | Set a break point at the cursor position, or cancel the set break point. | (Common) |
| | Enable/Disable Break Point | Enable/disable the break point at the cursor position. | |
| | Cancel All Break Points | Cancel all break points. | |
| | Break Point Window | Display the Break Point window. | |
| | Cancel All Break Devices | Cancel all break devices. | |
| | Break Device Window | Display the Break Device window. | |
| Skip Setting | | | – |
| | Set/Cancel Skip Range | Set a skip range, or cancel the set skip range. | (Common) |
| | Enable/Disable Skip Range | Enable/disable the skip range at the cursor position. | |
| | Cancel All Skip Ranges | Cancel all skip ranges. | |
| | Skip Range Window | Display the Skip Range window. | |

| Diagnostics (common function) | | Reference |
|---|---|---|
| PLC Diagnostics | Diagnose the operating status of the programmable controller CPU. | (Common) |
| Ethernet Diagnostics | Diagnose Ethernet. | |
| CC IE Control Diagnostics | Diagnose CC-Link IE Controller Network. | |
| CC IE Field Diagnostics | Diagnose CC-Link IE Field Network. | |
| MELSECNET Diagnostics | Diagnose MELSECNET/10(H). | |
| CC-Link Diagnostics | Diagnose CC-Link and CC-Link/LT. | |
| System Monitor | Monitor the system status of the programmable controller CPU. | |
| Online Module Change | Change modules online. | |

| Tool (common function) | | | Reference |
|---|---|---|---|
| IC Memory Card | | | – |
| | Read IC Memory Card | Read data from the IC memory card. | (Common) |
| | Write IC Memory Card | Write data to the IC memory card. | |
| Check Program | | Check programs of the project without labels and display errors. | Section 10.1.4 |
| Check Parameter | | Check parameters and display errors. | (Common) |
| Options | | Set various options. | Chapter 13 |
| Key Customize | | Change the settings of the shortcut keys. | (Common) |
| Device/Label Automatic-Assign Setting | | Set device range to be automatically assigned to a label. | Section 5.7 |
| Block Password | | Set a block password to data. | (Common) |
| Confirm Memory Size | | Calculate the size of files to be written to the programmable controller CPU. | |
| Set TEL Data/Connect via Modem | | | – |
| | Line Connection | Connect the line. | (Common) |
| | Line Disconnection | Disconnect the line. | |
| | AT Command Registration | Register a modem between a personal computer and a serial communication module, or a personal computer and an FXCPU. | |
| | Phone Book | Set phone numbers of targets such as remote access targets. | |
| | Options | Set options for TEL data. | |
| LCPU Logging Configuration Tool | | Start the LCPU logging configuration tool. | |
| Ethernet Adapter Module Configuration Tool | | Start the Ethernet adapter module configuration tool. | |
| Built-in I/O Module Tool | | | – |
| | Positioning Monitor | Display the Positioning Monitor screen. | (Common) |
| | High-Speed Counter Monitor | Display the High-Speed Counter Monitor screen. | |
| | I/O Monitor | Display the I/O Monitor screen. | |
| Check Intelligent Function Module Parameter | | | – |
| | Check Auto Refresh Duplication | Check the duplication of devices set in the Auto refresh function and display the result. | (Common) |
| Intelligent Function Module Tool | | | – |
| | Analog Module | – | (Intelligent) |
| | Offset/Gain Setting | Configure the offset/gain setting of the analog module. | |
| | Q61LD Two-Point Calibration Setting | Configure the Q61LD two-point calibration setting. | |
| | Q61LD Default Setting | Configure the Q61LD default setting. | |
| | Temperature Input Module | – | |
| | Offset/Gain Setting | Configure the offset/gain setting of the temperature input module. | |
| | Temperature Control Module | – | |
| | Auto Tuning | Execute the auto tuning function of the temperature control module. | |
| | Sensor Correction Function | Execute the sensor correction function of the temperature control module. | |
| | Counter Module | – | |
| | Preset | Execute the preset function of the counter module. | |
| | QD75/LD75 Positioning Module | – | |
| | Positioning Monitor | Execute the positioning monitor. | |
| | Positioning Test | Execute the positioning test. | |
| | Wave Trace | Execute the wave trace. | |
| | Location Trace | Execute the location trace. | |
| | Serial Communication Module | – | |
| | Circuit Trace | Execute the circuit trace. | |
| | Predefined Protocol Support Function | Start the predefined protocol support function. | |
| Language Selection | | Select a language used in a project. | (Common) |

| Window (common function) | | Reference |
|---|---|---|
| Cascade | Tile windows in overlapping display. | (Common) |
| Tile Vertically | Tile windows vertically. | |
| Tile Horizontally | Tile windows horizontally. | |
| Arrange Icons | Arrange the icons at the bottom of the window. | |
| Close All | Close all open windows. | |
| (Switch to other window) | Display the open window. | |
| Window | Display a list of open windows.<br>Also open or arrange specified windows. | |

| Help (common function) | | Reference |
|---|---|---|
| GX Works2 Help | Display the GX Works2 Help screen. | (Common) |
| Operating Manual | | – |
| GX Works2 Beginner's Manual (Simple Project) | Display the operating manuals. | (Common) |
| GX Works2 Beginner's Manual (Structured Project) | | |
| Operating Manual Common | | |
| Operating Manual (Simple Project) | | |
| Operating Manual (Structured Project) | | |
| Operating Manual (Intelligent Function Module) | | |
| About | Display product information such as the version. | |

## ■ List of functions for setting labels

The following table shows the functions for setting and editing labels.

| Edit (function for label setting) | | Reference |
|---|---|---|
| Delete | Delete the selected data. | – |
| Select All | Select all items. | Section 5.5.4 |
| New Declaration (Before) | Add a row above the cursor position. | |
| New Declaration (After) | Add a row below the cursor position. | |
| Delete Row | Delete a row at the cursor position. | |
| Read from CSV File | Read label settings from the CSV file. | Section 5.8 |
| Write to CSV File | Write label settings to the CSV file. | |
| System Label | | – |
| Confirm Update of System Label Database | Reflect system label information changed in another project on global labels. | Section 5.2 |
| Import System Label | Import system label information and reflect it on global labels. | |
| Register Device Name of System Label | Register a selected global label as a system label. | |
| Disable System Label Relation | Disable the relation between a selected global label and a system label. | |
| Execute Verification Synchronous with System Label | Resolve a mismatch when system label information contains it. | – |

## ■ List of functions for editing device comments

The following table shows functions for editing device comments.

| Edit (function for editing device comments) | | | Reference |
|---|---|---|---|
| Delete | | Delete the selected data. | – |
| Select All | | Select all data being displayed. | (Common) |
| Import from Sample Comment | | | |
| | Special Relay/Special Register | Utilize sample comments of SM/SD. | |
| | Intelligent Function Module | Utilize sample comments of intelligent function module device. | |
| Clear All | | Delete all device comment data. | |
| Read from CSV File | | Read device comments from the CSV file. | |
| Write to CSV File | | Write device comments to the CSV file. | |
| Hide Bit Specification Information | | Hide the bit-specified word device comment of the selected row. | |
| Show Bit Specification Information | | Display the bit-specified word device comment of the selected row. | |
| Cut The Range including Hidden Bit Specification Information | | Cut data including hidden bit-specified comment. | |
| Copy The Range including Hidden Bit Specification Information | | Copy data including hidden bit-specified comment. | |
| Paste The Range including Hidden Bit Specification Information | | Paste data including hidden bit-specified comment. | |

## ■ List of functions for setting device memory

The following tables show the functions for setting device memory.

| Edit (function for setting device memory) | | Reference |
|---|---|---|
| Delete | Delete the selected data. | – |
| Insert Row | Insert a row at the cursor position. | (Common) |
| Input Device | Enter a device. | |
| Paste Text | Enter a character string. | |
| FILL | Set the same value to continuous devices simultaneously. | |

| Find/Replace (function for setting device memory) | | Reference |
|---|---|---|
| Find Device Cell | Search for a device. | (Common) |

| View (function for setting device memory) | | | Reference |
|---|---|---|---|
| Display Mode | | | – |
| | Binary | Display data in binary. | (Common) |
| | Octal | Display data in octal. | |
| | Decimal | Display data in decimal. | |
| | Hexadecimal | Display data in hexadecimal. | |
| | Float | Display data in real number. | |
| | String | Display data in character string. | |
| | String (ASCII only) | Display data in ASCII string. | |
| Register | | | – |
| | 16-bit | Display data in units of words. | (Common) |
| | 32-bit | Display data in units of double words. | |
| | 64-bit | Display data in units of 64 bits. | |
| Setup | | Change the editor size. | |

| Tool (function for setting device memory) | | Reference |
|---|---|---|
| Read Device Memory from PLC | Read device memory data from the programmable controller CPU. | (Common) |
| Write Device Memory to PLC | Write device memory data to the programmable controller CPU. | |
| Read from Excel File | Read data from an Excel file. | |
| Write to Excel File | Write data to an Excel file. | |

## ■ List of functions for verification result

The following tables show the functions for verification result.

| Edit (function for verification result) | | Reference |
|---|---|---|
| Write to CSV File | Write verification result to a CSV file. | (Common) |

| Find/Replace (function for verification result) | | Reference |
|---|---|---|
| Next Unmatch | Move to the next mismatched data. | (Common) |
| Previous Unmatch | Move to the previous mismatched data. | |

| View (function for verification result) | | Reference |
|---|---|---|
| Return to Result List | Return to the <<Verify Result List>> tab from the <<Detail Verify Result>> tab. | (Common) |
| Close Detail Result | Close the <<Detail Verify Result>> tab being displayed. | |
| Close All Detail Result | Close all <<Detail Verify Result>> tabs being displayed. | |

## ■ List of functions for executing sampling trace

The following tables show the functions for executing sampling trace.

| View (function for executing sampling trace) | | | Reference |
|---|---|---|---|
| Result Position | | | (Common) |
| | Move to Trigger Point | Display the trigger position. | |
| Switching Display Items | | | – |
| | Device | Display/hide the display item titles. | (Common) |
| | Address | | |
| | Comment | | |
| | Data Types | | |
| | Radix | | |
| Timing Chart Scale | | | – |
| | Narrow Scale | Change the display width of the timing chart scale. | (Common) |
| | Wide Scale | | |
| Trend Graph Scale | | | |
| | Narrow Scale | Change the display width of the trend graph scale. | (Common) |
| | Wide Scale | | |
| | Initial Display | | |
| Additional Information | | | – |
| | Past Time | Display/hide the additional information. | (Common) |
| | Program Name | | |

| Debug (function for executing sampling trace) | | | Reference |
|---|---|---|---|
| Sampling Trace | | | – |
| | Open Sampling Trace | Display the Sampling Trace screen. | (Common) |
| | Trace Setting | Display the screen on which the sampling trace conditions are set. | |
| | Start Trace | Start sampling trace. | |
| | Stop Trace | Suspend sampling trace. | |
| | Execute Manual Trigger | Generate a trigger at any given timing. | |
| | Register Trace | Write trace settings to the programmable controller CPU. Execute this to control the sampling trace start by a sequence program. Sampling trace starts when the Trace start command (SM801) is executed after executing "Register Trace". | |
| | Forced Execution Registration Effective | Enable to execute the sampling trace from the peripherals. | |
| | Display Trace Buffer Condition | Display trace data storage status. | |
| | Export CSV Data | Save the trace data (trace settings + results) to a personal computer in CSV file format. | |
| | Read from PLC | Read the sampling trace data (trace settings + results) from the programmable controller CPU. | |
| | Write to PLC | Write the trace data (trace settings + results) to the programmable controller CPU. | |
| | Delete All Data | Delete all information including the device data registered and the sampling trace result displayed on the Sampling Trace screen. | |

## 1.3.2 List of functions for editing in ladder language

The following tables show the functions for editing with the ladder editor.

| Edit (function for editing in ladder language) | | Reference |
|---|---|---|
| Delete | Delete the selected data. | – |
| Restore After Ladder Conversion | Return a ladder being edited to the last converted status. | Section 6.13 |
| Insert Row | Insert a row at the cursor position. | Section 6.9 |
| Delete Row | Delete a row at the cursor position. | |
| Insert Column | Insert a column at the cursor position. | |
| Delete Column | Delete a column at the cursor position. | |
| NOP Batch Insert | Insert an NOP in front of the ladder block at the cursor position. | Section 6.10 |
| NOP Batch Delete | Batch-delete NOPs in the program being edited. | |
| Edit Line | Enter a line at the cursor position. | Section 6.6.1 |
| Delete Line | Delete a line at the cursor position. | Section 6.8.1 |
| Change TC Setting | Batch-change timer/counter setting values used in the program. | Section 6.15 |
| Ladder Edit Mode | | – |
| Read Mode | Switch the mode of the open window to "Read Mode". | Section 6.1.2 |
| Write Mode | Switch the mode of the open window to "Write Mode". | |
| Ladder Symbol | | – |
| Open Contact | Insert F5 at the cursor position. | Section 6.2 |
| Close Contact | Insert F6 at the cursor position. | |
| Open Branch | Insert sF5 at the cursor position. | |
| Close Branch | Insert sF6 at the cursor position. | |
| Coil | Insert F7 at the cursor position. | |
| Application Instruction | Insert F8 at the cursor position. | |
| Vertical Line | Insert sF9 at the cursor position. | Section 6.6.2 |
| Horizontal Line | Insert F9 at the cursor position. | |
| Delete Vertical Line | Insert cF10 at the cursor position. | Section 6.8.2 |
| Delete Horizontal Line | Insert cF9 at the cursor position. | |
| Pulse Contact Symbol | | – |
| Rising Pulse | Insert sF7 at the cursor position. | Section 6.2 |
| Falling Pulse | Insert sF8 at the cursor position. | |
| Rising Pulse Branch | Insert aF7 at the cursor position. | |
| Falling Pulse Branch | Insert aF8 at the cursor position. | |
| Rising Pulse Close | Insert saF5 at the cursor position. | |
| Falling Pulse Close | Insert saF6 at the cursor position. | |
| Rising Pulse Close Branch | Insert saF7 at the cursor position. | |
| Falling Pulse Close Branch | Insert saF8 at the cursor position. | |
| Invert Operation Results | Insert caF10 at the cursor position. | |
| Operation Result Rising Pulse | Insert aF5 at the cursor position. | |
| Operation Result Falling Pulse | Insert caF5 at the cursor position. | |

| Edit (function for editing in ladder language) | | | Reference |
|---|---|---|---|
| Inline Structured Text | | | – |
| | Insert Inline Structured Text Box | Insert an inline structured text box. | Section 6.4.2 |
| | Display Template | Insert a template corresponds to the instruction, function, or control syntax. | (Structured) |
| | Mark Template (Left) | Set an argument of the template in the selected status from the left by selecting the menu each time. | |
| | Mark Template (Right) | Set an argument of the template in the selected status from the right by selecting the menu each time. | |
| Edit FB Instance | | Rename an FB instance name. | Section 6.3.4 |
| Documentation | | | – |
| | Device Comment | Edit device comments. | (Common) |
| | Statement | Edit statements. | Section 9.2 |
| | Note | Edit notes. | |
| | Statement/Note Batch Edit | Batch-edit the statements/notes in the program. | Section 9.3 |
| Easy Edit | | | – |
| | Connect Line to Right-Side Symbol | Connect a horizontal line to the instruction or the line at the right of the cursor position. | Section 6.6 |
| | Connect Line to Left-Side Symbol | Connect a horizontal line to the instruction or the line at the left of the cursor position. | |
| | Enter/Delete HLine Rightward | Enter/delete a line at the right of the cursor position. | |
| | Enter/Delete HLine Leftward | Enter/delete a line at the left of the cursor position. | |
| | Enter/Delete VLine Downward | Enter/delete a line at the downward of the cursor position. | |
| | Enter/Delete VLine Upward | Enter/delete a line at the upward of the cursor position. | |
| | Switch Open/Close Contact | Switch between an open contact and a closed contact. | (Common) |
| | Switch Statement/Note Type | Change the type of a statement/note. | Section 9.4 |
| | Instruction Partial Edit | Display the Enter Symbol screen in which the first argument is in the selected status. | Section 6.2 |

| Find/Replace (function for editing in ladder language) | | Reference |
|---|---|---|
| Change Module I/O No. | Replace the start module I/O number of the buffer memory address instruction. | Section 8.1.3 |
| Switch Statement/Note Type | Change the type (PLC/Peripheral) of a statement/note. | Section 9.4 |
| Line Statement List | Display a list of line statements used in the program. | Section 9.6 |
| Jump | Move the cursor to the specified step position. | Section 8.1.2 |
| Jump to Next Ladder Block Start | Move the cursor from the current position to the start of the next ladder block. | Section 6.5 |
| Jump to Previous Ladder Block Start | Move the cursor from the current position to the start of the previous ladder block. | |

| View (function for editing in ladder language) | | Reference |
|---|---|---|
| Comment | Display device comments. | Section 2.2.4 |
| Statement | Display statements. | |
| Note | Display notes. | |
| Display Lines of Monitored Current Value | Open the Options screen and display/hide the lines of monitored current value. | Section 2.2.5 |
| Display Format for Device Comment | Open the Options screen and set the display format for device comment. | Section 2.2.6 |
| Non-Display Ladder Block | Hide a ladder block at the cursor position. | Section 2.2.9 |
| Display Ladder Block | Display a hidden ladder block at the cursor position. | |
| Non-Display All Ladder Block | Hide all ladder blocks. | |
| Display All Ladder Block | Display all hidden ladder blocks. | |
| Device Display | Display the device assigned by compilation. | Section 2.2.8 |
| All Device Display | Batch-change the label display on the program editors to the device display. | |
| Cancel All Device Display | Cancel the device display on the program editors, and display data in the format at the time of data entry. | |
| Display Compile Result | Display the compilation result of the program on the inline structured text box in a list form. | Section 6.4.3 |
| Zoom | Change the display magnification of the ladder. | Section 2.2.2 |
| Text Size | | – |
| Bigger | Enlarge the text display size on the editing screen. | Section 2.2.3 |
| Smaller | Reduce the text display size on the editing screen. | |
| Tile FB Horizontally | Tile the ladder editor and the function block program editor horizontally. | Section 6.3.5 |
| Open Header | Open the setting screen for the label set for a program being edited. | Section 6.2.6 |
| Back to Zoom SFC Block | Display the SFC diagram of the Zoom editor window. | – |
| Move SFC Cursor | | – |
| Up | Move the cursor on the SFC diagram upward. | Section 2.3.1 |
| Down | Move the cursor on the SFC diagram downward. | |
| Left | Move the cursor on the SFC diagram to the left. | |
| Right | Move the cursor on the SFC diagram to the right. | |
| Open Instruction Help | Display the Instruction Help screen. | Section 6.2.2 |

## 1.3.3 List of functions for editing SFC diagrams

The following tables show the functions for editing SFC diagrams.

| Edit (function for editing SFC diagrams) | | | Reference |
|---|---|---|---|
| Delete | | Delete the selected data. | – |
| Arrange SFC | | Redisplay the SFC diagram. | Section 7.8 |
| Insert Row | | Insert a row at the cursor position. | Section 7.3.11 |
| Delete Row | | Delete a row at the cursor position. | |
| Insert Column | | Insert a column at the cursor position. | |
| Delete Column | | Delete a column at the cursor position. | |
| Edit Line | | | – |
| | Vertical Line Segment | Insert aF5 at the cursor position. | Section 7.3.10 |
| | Selection Divergence | Insert aF7 at the cursor position. | |
| | Simultaneous Divergence | Insert aF8 at the cursor position. | |
| | Selection Convergence | Insert aF9 at the cursor position. | |
| | Simultaneous Convergence | Insert aF10 at the cursor position. | |
| Delete Line | | Delete a line at the cursor position. | |
| Change TC Setting | | Batch-change timer/counter setting values used in the program. | Section 6.15 |
| Ladder Edit Mode | | | – |
| | Read Mode | Switch the mode of the open window to "Read Mode". | Section 6.1.2 |
| | Write Mode | Switch the mode of the open window to "Write Mode". | |
| SFC Step Attribute | | | – |
| | No Attribute | Set the step attribute to No Attribute. | Section 7.5 |
| | Stored Coil | Set the step attribute to Stored Coil. | |
| | Stored Operation (without Transition Check) | Set the step attribute to Stored Operation (SE). | |
| | Stored Operation (with Transition Check) | Set the step attribute to Stored Operation (ST). | |
| | Reset | Reset the step attribute. | |
| SFC Symbol | | | – |
| | [STEP] Step | Insert F5 at the cursor position. | Section 7.3.1 |
| | [B] Block Start Step (with END Check) | Insert F6 at the cursor position. | Section 7.3.2 |
| | [BS] Block Start Step (without END Check) | Insert sF6 at the cursor position. | |
| | [JUMP] Jump | Insert F8 at the cursor position. | Section 7.3.8 |
| | [END] END Step | Insert F7 at the cursor position. | Section 7.3.9 |
| | [DUMMY] Dummy Step | Insert sF5 at the cursor position. | Section 7.3.1 |
| | [TR] Transition | Insert F5 at the cursor position. | Section 7.3.3 |
| | [--D] Selection Divergence | Insert F6 at the cursor position. | Section 7.3.4 |
| | [==D] Simultaneous Divergence | Insert F7 at the cursor position. | Section 7.3.5 |
| | [--C] Selection Convergence | Insert F8 at the cursor position. | Section 7.3.6 |
| | [==C] Simultaneous Convergence | Insert F9 at the cursor position. | Section 7.3.7 |
| | [ \| ] Vertical Line | Insert sF9 at the cursor position. | – |

| Edit (function for editing SFC diagrams) | | | Reference |
|---|---|---|---|
| Sort SFC Step No. | | Sort the SFC step/transition numbers in ascending/ descending order. | Section 7.7 |
| Documentation | | | – |
| | SFC Step/Transition Comment | Change to the SFC step/transition comment editing mode. | Section 9.8 |

| Find/Replace (function for editing SFC diagrams) | | Reference |
|---|---|---|
| Jump | Move the cursor to the specified position. | Section 8.2.1 |
| Find Jump Step | Move to the jump source step. | Section 8.2.2 |
| Change SFC Step No. | Replace the SFC step number. | Section 8.2.4 |

| View (function for editing SFC diagrams) | | Reference |
|---|---|---|
| Program Display | Display MELSAP-L programs. | Section 2.3.3 |
| SFC Step/Transition Comment | Display the SFC step/transition comments. | Section 2.3.4 |
| Zoom | Change the display magnification ratio of the SFC diagram. | Section 2.3.2 |
| SFC Row Setting | Set the number of rows of SFC diagram. | Section 2.3.5 |
| Open SFC Blocklist | Display the SFC block list screen. | Section 7.11 |
| MELSAP3 Display | Display SFC in MELSAP3 format. | Section 2.3.6 |
| MELSAP-L (Instruction Format) Display | Display SFC in MELASP-L (instruction format). | |
| MELSAP-L (Start Conditions Format) Display | Display SFC in MELSAP-L (start conditions format). | |
| Open Zoom/Start Destination Block | Display the Zoom editor window or the start destination block. | Section 7.9 |
| Back to Start SFC Block | Display the SFC block of the start source. | – |
| Open Header | Open the setting screen of labels set for the program being edited. | |

## 1.3.4 List of functions for editing SFC block list

The following tables show the functions for editing SFC block list.

| Find/Replace (function for editing SFC block list) | | Reference |
|---|---|---|
| Jump | Move the cursor to the specified block number. | Section 8.2.5 |
| Block Information Find Device | Search for a device. | Section 8.2.6 |

| View (function for editing SFC block list) | | Reference |
|---|---|---|
| SFC Block List Comment | Display comments of the SFC block list. | Section 7.11.1 |
| Device Display | Display devices. | Section 7.11.2 |
| Open SFC Body | Open the SFC diagram. | Section 7.11.3 |
| Open Header | Display the label setting screen. | Section 7.11.4 |

## 1.3.5 List of functions for Structured project

For the functions for editing in the ST/structured ladder/FBD language, refer to the following manual.
☞ GX Works2 Version 1 Operating Manual (Structured Project)

# 2 SCREEN CONFIGURATION

This chapter explains the screen configuration of GX Works2.

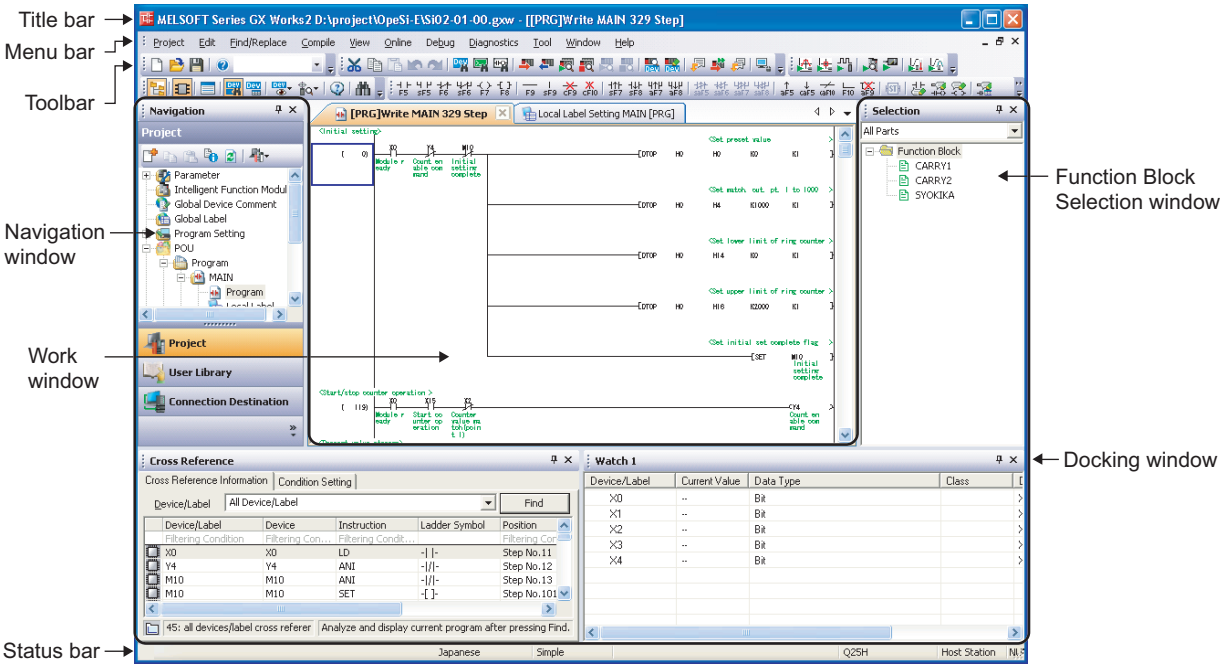

**2.1 Overview of Screen Configuration . . . . . 2-2**
**2.2 Ladder Editor . . . . . 2-3**
**2.3 SFC Editor . . . . . 2-14**

# 2.1 Overview of Screen Configuration

Q CPU L CPU FX

This section explains the main frame (basic screen) of GX Works2 that is displayed when it is started up. The following screen shows a main frame configuration in which a work window and docking windows are displayed.

## Screen display




## Display contents

| Name | Description | Reference |
|---|---|---|
| Title bar | Display a project name. | – |
| Menu bar | Display menu options for executing each function. | – |
| Toolbar | Display tool buttons for executing each function. | Appendix 1 |
| Work window | A main screen used for operations such as programming, parameter setting, and monitoring. | GX Works2 Version 1 Operating Manual (Common) |
| Docking window | A sub screen to support operations performed on a work window. | |
| Navigation window | Display contents of a project in tree format. | |
| Function Block Selection window | Display a list of functions (such as function blocks) used for programming. | Section 6.3 |
| Output window | Display compilation and check results (errors and warnings). | Section 10.4 |
| Cross Reference window | Display cross reference results. | GX Works2 Version 1 Operating Manual (Common) |
| Device List window | Display the device list. | |
| Watch window 1 to 4 | A screen used for monitoring and changing current device values. | |
| Intelligent Function Module Monitor 1 to 10 | A screen used for monitoring intelligent function modules. | |
| Find/Replace window | A screen used for searching and replacing character strings in the project. | |
| Status bar | Display information about a project being edited. | |

# 2.2 Ladder Editor

This section explains the screen display of the GX Works2 ladder editor and its basic operations.

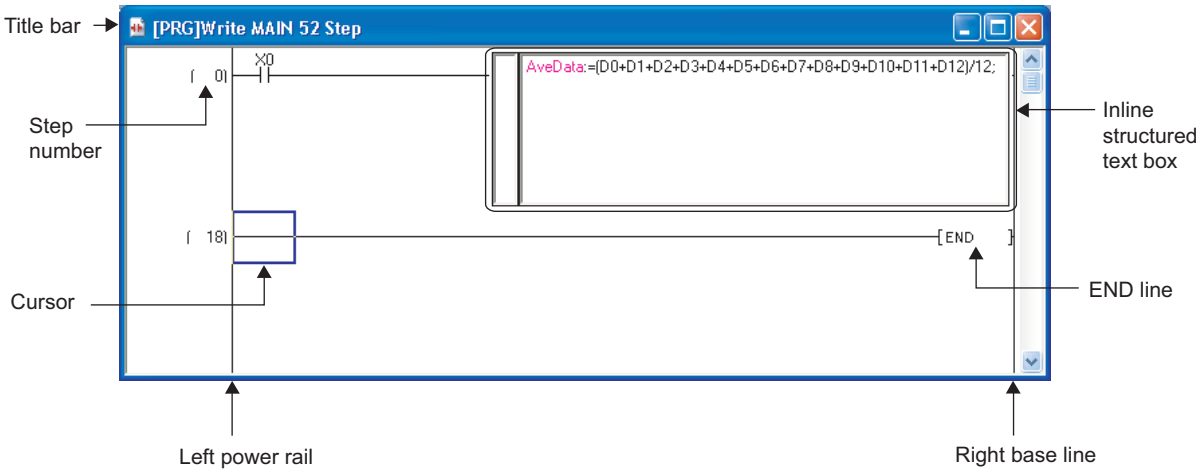
## 2.2.1 Editing screen

Q CPU L CPU FX

The following explains the editing screen used for creating ladders.

### Screen display

- For a project without labels
  Select Project view ⇒ "POU" ⇒ "Program" ⇒ "(program)".
- For a project with labels
  Select Project view ⇒ "POU" ⇒ "Program" ⇒ "(program)" ⇒ "Program".




### Display contents

| Name | Description |
|---|---|
| Title bar | Display a data type, data name, and/or other information of the open data. |
| Step number | Display a start step number of the ladder block. |
| Inline structured text box | An area for editing ST programs on the ladder editor in a project with labels. (☞ Section 6.4) |
| Cursor | Data at the cursor position are edited. |
| Left power rail | Base lines of ladder programs. |
| Right base line | |
| END line | Indicate the end of a ladder program. Programs cannot be created beyond the END line. |

## ■ Displaying title bar

The following items are displayed on a title bar.

| Item | Description |
|---|---|
| Nesting number of master control | Display a nesting number when the cursor position is on the nesting of master control. |
| Data type | Display a data type of data being open. |
| Ladder edit mode | Display the ladder edit mode. (☞ Section 6.1.2)<br>For when programs are monitored and for when programs are not monitored, "Monitoring" and "Stop Monitoring" are appended respectively.<br>When the "Execute online change by Compile" item is selected in the option setting, "R" is prefixed to the ladder edit mode. |
| Data name | Display a data name of data being open. |
| Instance name | Display an instance name when a program of FB instance is displayed on a program. |
| Title | Display when a title is set on the property. |
| Read-only display | Display in the following cases.<br>• When a write protection is set with the security setting<br>• When a program is a device display (☞ Section 2.2.8)<br>• When the mode is switched to the read mode or the monitor mode with the ladder edit mode |
| Number of steps | Display the number of steps of program.<br>Display with the parentheses for the programs with function block or uncompiled status. |
| Compilation status | Display " * " when a program of project with labels is uncompiled. |

<Title bar example of program>

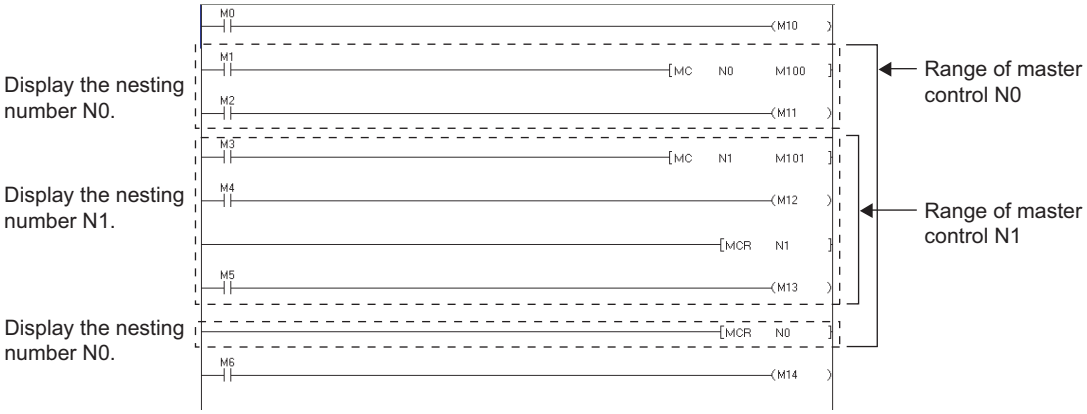



<Title bar example of FB instance opened in a program>



### ■ Nesting number of master control

When the cursor position is on the nesting of master control, the nesting number of master control is displayed on a title bar. The nesting number of innermost master control is displayed in a master control with nesting architecture.
The following figure shows the range where the nesting number of master control is displayed.



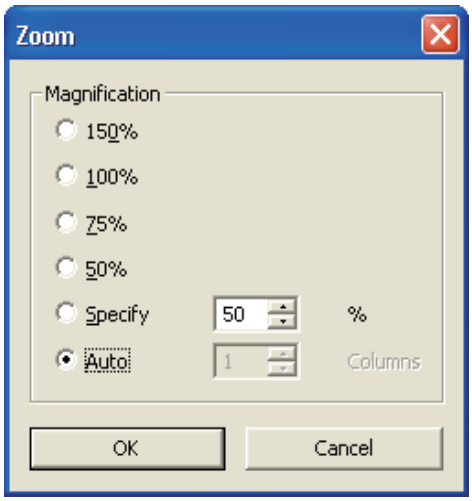

## 2.2.2 Changing display size of editing screen

Q CPU L CPU FX

Change the display size of the editing screen.

### Screen display

Select [View] ⇒ [Zoom] ( ).




### Display contents

| Item | Description |
|---|---|
| 150%, 100%, 75%, 50% | Change the display size according to the selected zoom ratio. |
| Specify | Change the display size according to the specified zoom ratio. |
| Auto | Adjust the width of the ladder automatically to display the entire ladder. |

## 2.2.3 Changing text size on editing screen

Q CPU L CPU FX

Change the text size displayed on the editing screen.

### Operating procedure

- Select [View] ⇒ [Text Size] ⇒ [Bigger]/[Smaller].

  The change is applied to all ladder editors currently opened.
  The text size is changed one step at each setting within the range of 10 steps.




## 2.2.4 Displaying/hiding comments

Q CPU L CPU FX

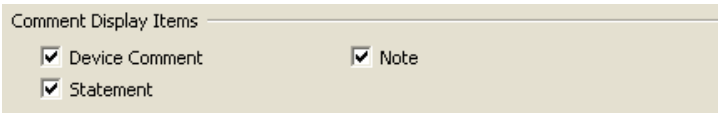
Display/hide device comments (label comments), notes, and statements.

### Operating procedure

- Select [View] ⇒ [Comment]/[Statement]/[Note].

**Point**

● **Displaying/hiding comments**
Comments also can be displayed/hidden on the Option screen displayed by the following operation.
Select [View] ⇒ [Display Format for Device Comment].

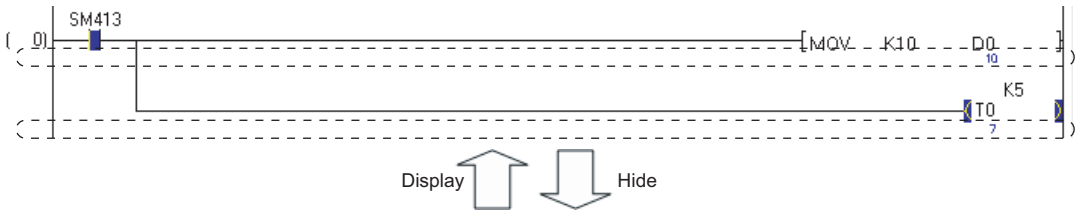


## 2.2.5 Displaying/hiding lines of monitored current value

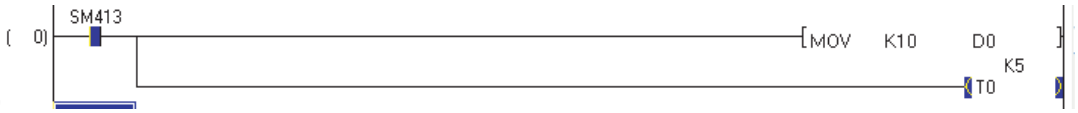
Q CPU L CPU FX

Display/hide the lines of monitored current value of word type variable.
Hide the lines of monitored current value to increase the ladder lines displayed on single screen, and check more ladders compared to the status of displaying lines of monitored current value.

Display the dashed-line areas (line of monitored current value).

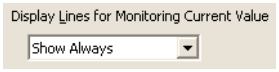



Hide the dashed-line areas (line of monitored current value).
(The lines are closed up.)




### Operating procedure

- Select [View] ⇒ [Display Lines of Monitored Current Value].
  The Options screen is displayed.



## 2.2.6 Setting number of rows and columns for displaying comments

Q CPU L CPU FX

Set the number of rows and columns for displaying a device comment using the option setting.

### Screen display

Select [View] ⇒ [Display Format for Device Comment].



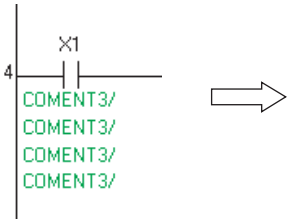

### Operating procedure

- Set the items on the screen.

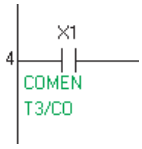
| Item | Description |
|---|---|
| Row | Set the number of display rows in the range from 1 to 4 rows. |
| Column | Set the number of display columns to 5 or 8 columns. |

Examples)

4 rows × 8 columns




2 rows × 5 columns



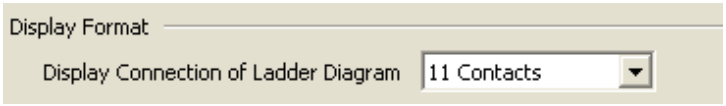
## 2.2.7 Setting number of contacts to be displayed in ladder programs

Q CPU L CPU FX

Set the number of contacts to be displayed in a single row using the option setting. The default setting is 11 contacts.

### Screen display

Select [Tool] ⇒ [Options] ⇒ "Program Editor" ⇒ "Ladder" ⇒ "Ladder Diagram".




### Operating procedure

- Set the items on the screen.

| Item | Description |
|---|---|
| Display Connection of Ladder Diagram | Select the number of contacts to be displayed in a single row.<br>• 9 contacts<br>• 11 contacts<br>• 13 contacts<br>• 17 contacts<br>• 21 contacts |

### Point

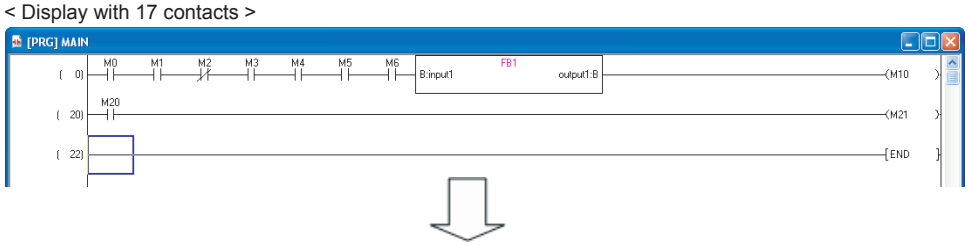
● **Precautions when changing the number of contacts to be displayed**

When the number of contacts is changed from the one used to create a ladder program to a less number of contacts, the program is not displayed properly in the following conditions.
In this case, set the number of contacts back to the original setting.

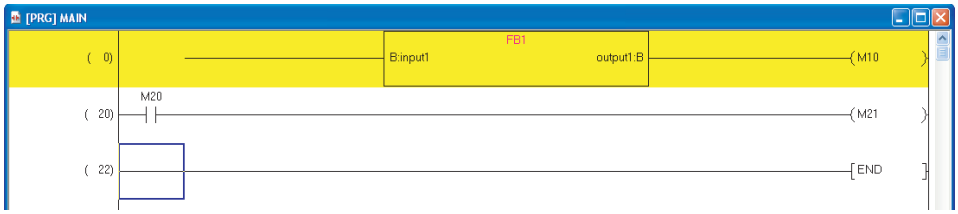
- When an instruction cannot be placed in the input ladder part or output ladder part of function block.
- When the number of rows for a single ladder block exceeds 24.

The following is an example of program in which instructions cannot be placed in the input ladder part of function block when a program created with 17 contacts is changed to 11 contacts.

< Display with 17 contacts >




< Display with 11 contacts >




● **Ladder program with 13 contacts or more**

The selection of 13 contacts or more is available from GX Works2 Version 1.48A or later.
Change the setting as follows when using GX Developer concurrently or using GX Works2 Version 1.43V or earlier.

- Set the same setting as the product running concurrently for "Display Connection of Ladder Diagram" in the option setting.
- For a program with 13 contacts or more, adjust the program for number of contacts to be 11 or less.

## 2.2.8 Switching display between label names and devices

Q CPU L CPU FX

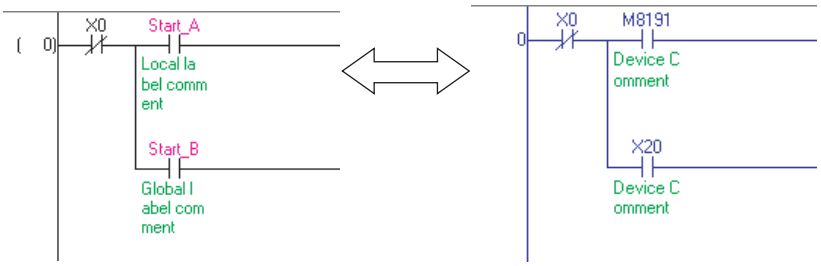
Switch the display of a program that uses labels between label name display and device display.
If label comments or device comments are set, the corresponding comments are displayed.
Devices assigned by the compilation can be checked by switching the program display from label name display to device display.
For FXCPU, when a block password with the validated setting for "Read-protect the execution program" exists, the device display cannot be executed.

### Operating procedure

- Select [View] ⇒ [Device Display] ( ).

  Example)

  Label name display Device display




**Point**

● **Displaying/hiding label comments and device comments**
To check the set label comments and device comments, set the setting to display comments. (☞ Section 2.2.4)

### ■ Changing display of all program editors to device display in batch

Change the display of all currently-opened program editors to the device display.

### Operating procedure

- Select [View] ⇒ [All Device Display].

  The display of all currently-opened program editors (except for ST) is changed to the device display.

### ■ Canceling device display of all program editors

Cancel the device display of all currently-opened program editors.

### Operating procedure

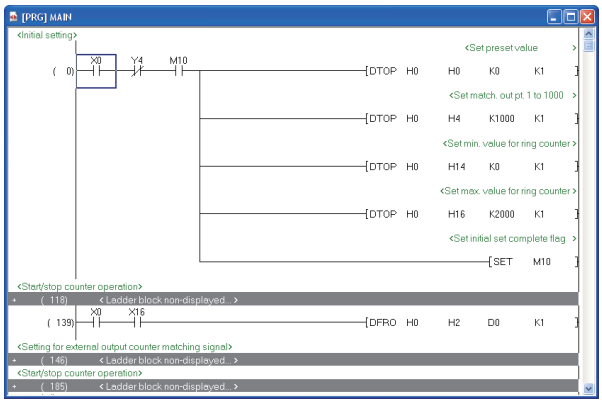
- Select [View] ⇒ [Cancel All Device Display].

  The device display of all program editors is canceled and data are displayed in the format at the time of data entry.

## 2.2.9 Hiding ladder blocks

Q CPU L CPU FX

Hide converted ladder blocks.
If statements are set to ladder blocks, they are remained displayed while ladder blocks are hidden.

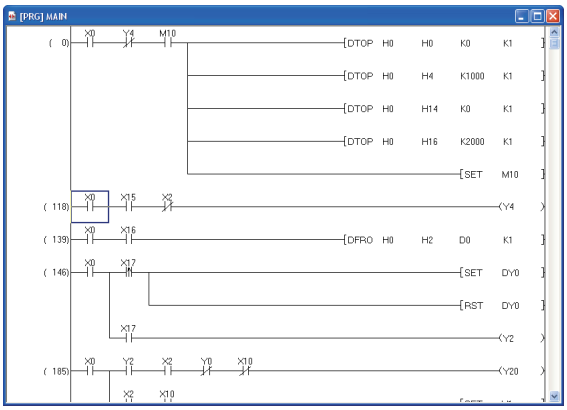



### ■ Hiding ladder blocks

Hide ladder blocks.

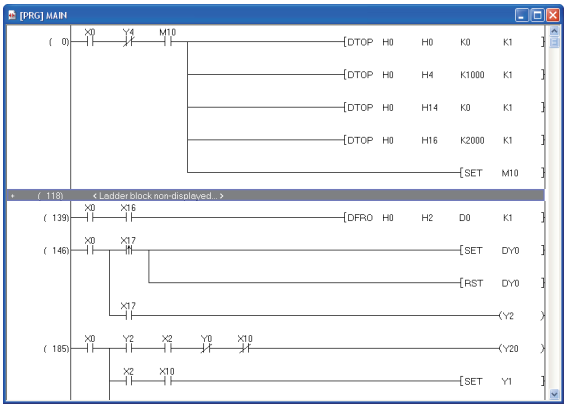
#### Operating procedure

1. **Move the cursor to the ladder block to be hidden.**




2. **Select [View] ⇒ [Non-Display Ladder Block].**

   The ladder block is hidden.

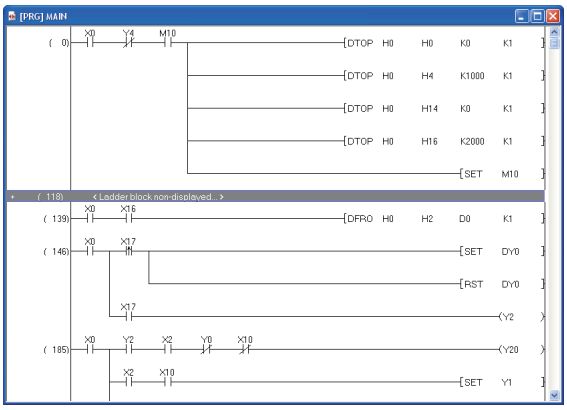


## ■ Displaying hidden ladder blocks

Display hidden ladder blocks.

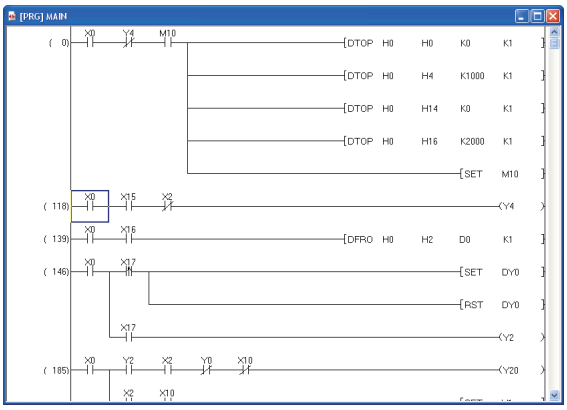
### Operating procedure

1. **Move the cursor on the gray line of the hidden ladder block.**




2. **Select [View] ⇒ [Display Ladder Block].**

   The hidden ladder block is displayed.




### Point

● **Displaying/hiding ladder blocks**
- Multiple ladder blocks can be selected to display/hide.
- All ladder blocks are displayed/hidden by selecting [View] ⇒ [Display All Ladder Block]/[Non-Display All Ladder Block].
- Ladder blocks can also be displayed/hidden by right-clicking and selecting [Display Ladder Block]/[Non-Display Ladder Block] from the shortcut menu.

## 2.2.10 Displaying step ladder (STL) instruction in contact format

Q CPU L CPU FX

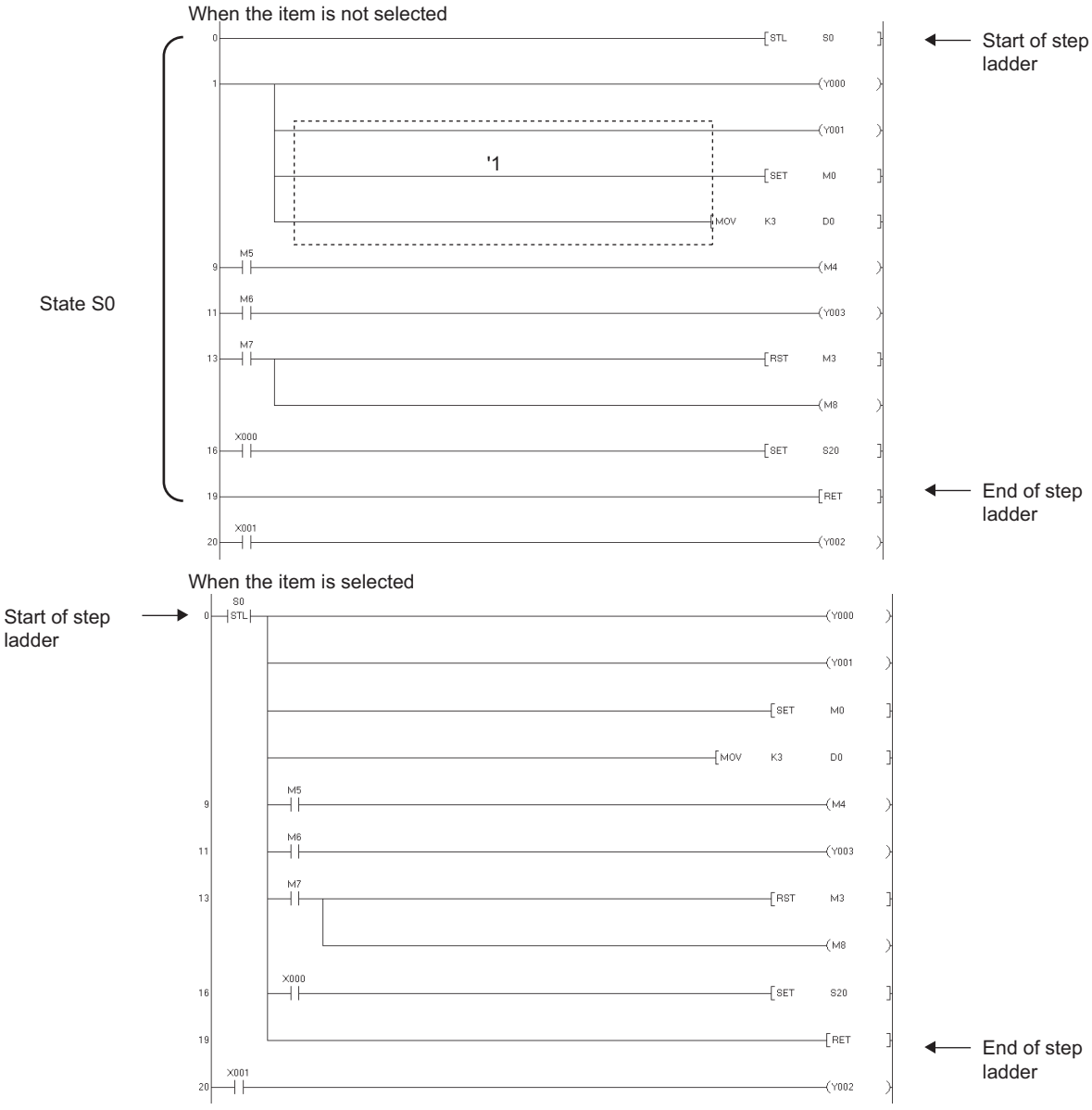
For FXCPU projects without labels, whether to display step ladder instructions in contact format can be selected by setting the option.

### Screen display

Select [Tool] ⇒ [Options] ⇒ "Program Editor" ⇒ "Ladder" ⇒ "Ladder Diagram".




Example:




*1: Do not enter contacts in the coil instruction part which is connected to the first coil instruction of the STL instruction. (The ladder to which a contact is entered cannot be displayed in this method.)

When entering contacts, enter them from the base line.

# 2.3 SFC Editor

Q CPU L CPU FX

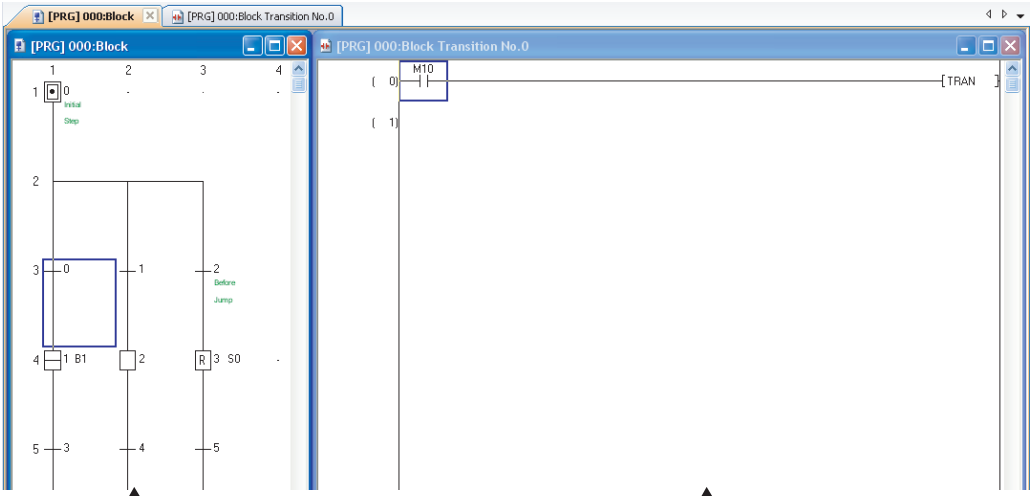
This section explains the screen display of the SFC editor and its basic operations.

## 2.3.1 Editing screen

The following explains the editing screen used for creating SFC diagrams.
A display format can be selected for QCPU (Q mode)/LCPU.
Select MELSAP3 to edit operation output and transition condition programs on the Zoom editor window.
Select MELSAP-L (instruction format) or MELSAP-L (start conditions format) to edit operation output and transition condition programs on the SFC editor window.
For switching the display format, refer to Section 2.3.6.

### Screen display

Select Project view ⇒ "POU" ⇒ "Program" ⇒ "(program)" ⇒ "(block)" ⇒ "Program".
< MELSAP3/FXCPU >




### Display contents

| Item | Description |
|---|---|
| SFC editor window | Used to edit SFC diagrams. |
| Zoom editor window | Used to edit operation output and transition condition programs. |

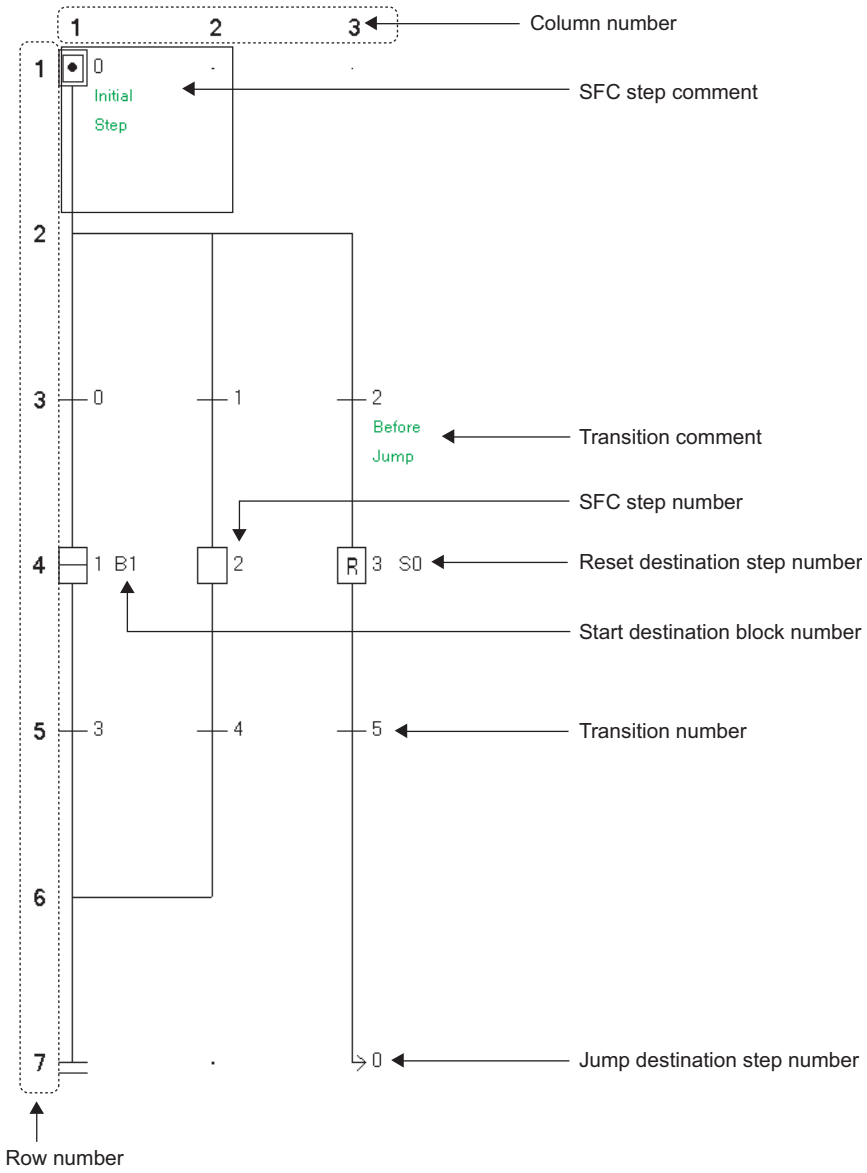
**Point**

- **Displaying SFC editor window and Zoom editor window**
  By the following setting, the Zoom editor window can be automatically displayed side by side when the SFC editor window is opened. The display of SFC editor and Zoom editor can be selected from Tiling Horizontally or Tiling Vertically.
  Select "Tile SFC and Zoom vertically" under [Tool] ⇒ [Options] ⇒ "Program Editor" ⇒ "SFC" ⇒ "SFC Diagram".
  When this setting is valid, the setting of "Open Zoom with New Window" under [Tool] ⇒ [Options] ⇒ "Program Editor" ⇒ "SFC" ⇒ "Zoom" becomes invalidated.
- **Moving a cursor of the SFC editor window on the Zoom editor window**
  With the activated Zoom editor window, a cursor of the SFC editor window can be moved.
  Select the direction to move a cursor by selecting [View] ⇒ [Move SFC Cursor] ⇒ [Up] / [Down] / [Left] / [Right]
  ( Shift + Alt + ↑ / ↓ / ← / → ).
  When the cursor of the SFC editor window is moved, the cursor of the Zoom editor window moves to the corresponding position.

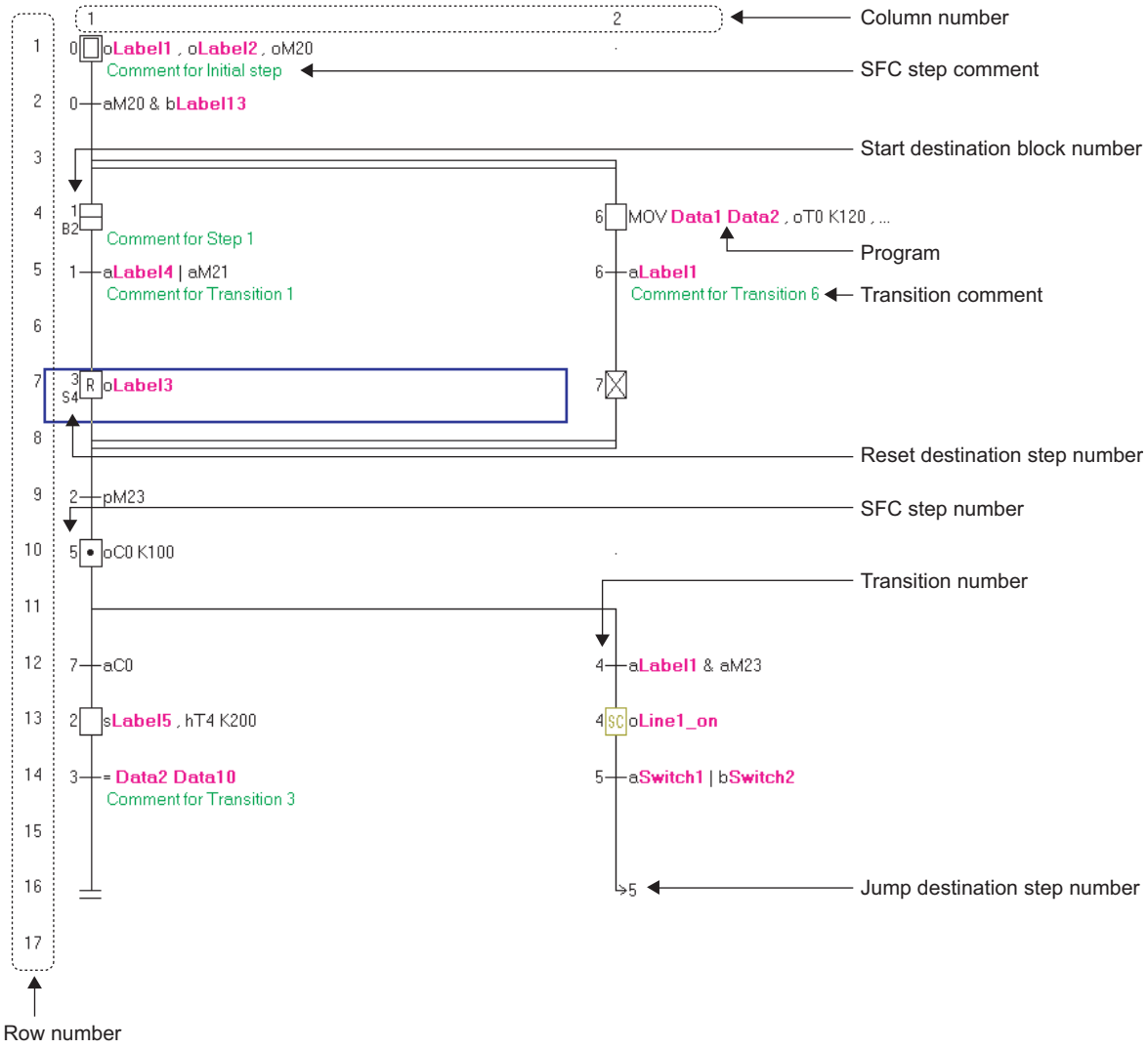
## ■ SFC editor window

The following explains the screen for editing a SFC diagram.

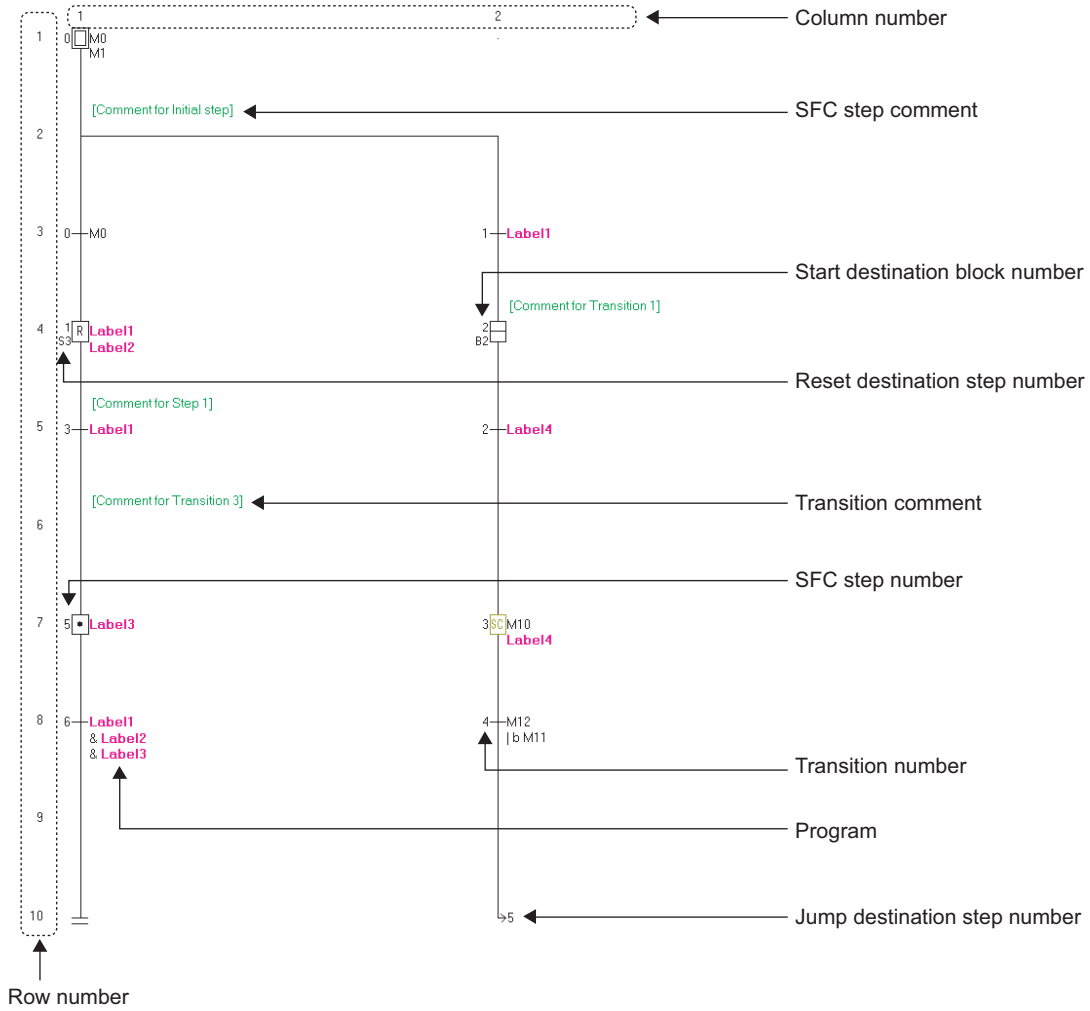
• MELSAP3/FXCPU



• MELSAP-L (instruction format)



• MELSAP-L (start conditions format)




## Display contents

| Item | Description |
|---|---|
| Row number | Display row numbers on the SFC diagram. |
| Column number | Display column numbers on the SFC diagram. |
| SFC step number | Display SFC step numbers for each step. |
| Transition number | Display transition numbers for each transition. |
| Start destination block number*1 | Display start destination block numbers for the block start step. |
| Reset destination step number*1 | Display reset destination step numbers for the reset step. |
| Jump destination step number | Display jump destination step numbers for the jump step. |
| SFC step comment | Display comments for each SFC step. |
| Transition comment*1 | Display comments for each transition. |
| Program | Display MELSAP-L programs. |

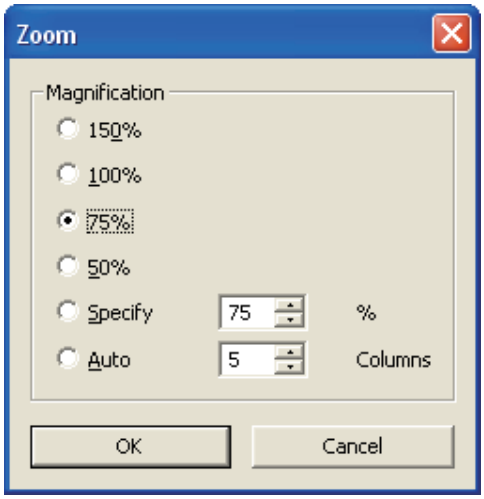
*1: Not supported by FXCPU

## 2.3.2 Changing display size of editing screen

Change the display size of the editing screen.

### Screen display

Select [View] ⇒ [Zoom] ( ).




### Display contents

| Item | Description |
|---|---|
| 150% 100% 75% 50% | Change the display size according to the selected zoom ratio. |
| Specify | Change the display size according to the specified zoom ratio. |
| Auto | Change the display size according to the specified number of columns. |

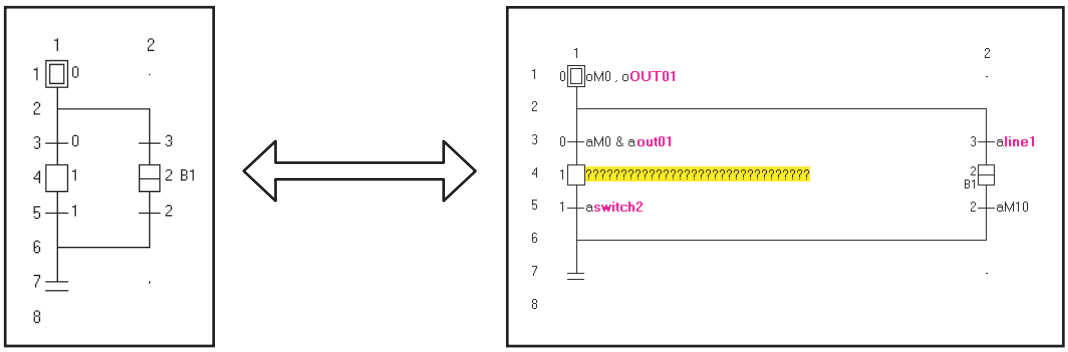
## 2.3.3 Displaying MELSAP-L programs on SFC diagram

Display programs on the SFC diagram when editing in MELSAP-L.

### Operating procedure

- Select [View] ⇒ [Program Display] ( Alt + Ctrl + F5 ).

  Select the menu again to hide the programs.
  "?" marks are displayed for programs that cannot be displayed in MELSAP-L.



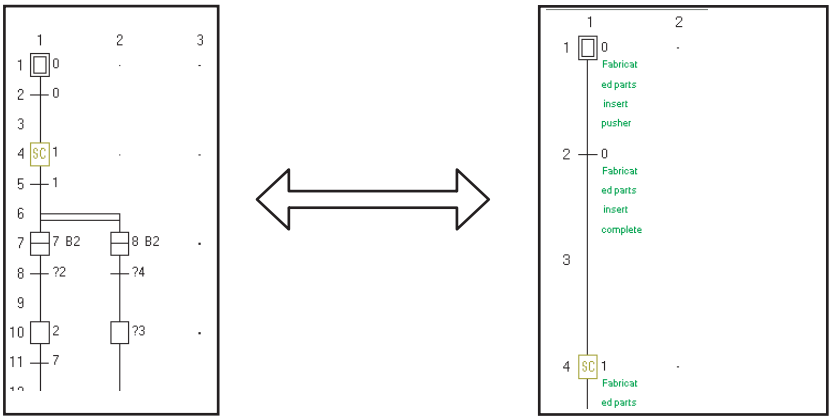

## 2.3.4 Displaying/hiding SFC step/transition comments

Display/hide SFC step/transition comments in the created SFC diagram.

### Operating procedure

- Select [View] ⇒ [SFC Step/Transition Comment] (Ctrl + F5).

  Select the menu again to hide SFC step/transition comments.

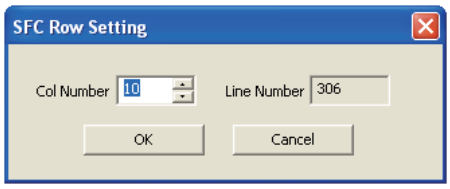


## 2.3.5 Setting number of columns for SFC diagram display

Set the number of divergences that can be edited and displayed for the SFC diagram.

### Screen display

Select [View] ⇒ [SFC Row Setting].




### Operating procedure

1. **Set the items on the screen.**

| Item | Description |
|---|---|
| Col Number | Enter the number of columns. |
| Line Number | Display the number of rows.<br>The value is changed automatically according to the specified number of columns. |

2. **Click the** OK **button.**

   The SFC diagram is displayed according to the specified number of columns.

## 2.3.6 Changing SFC display format

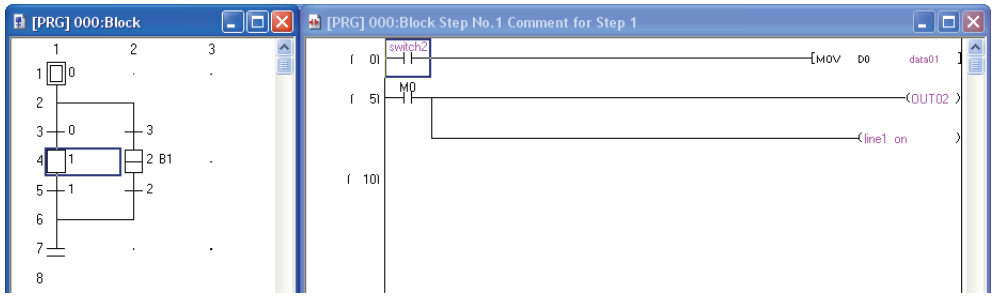
Change the SFC display format.
For Simple project, a display format can be selected for each program.
For Structured project, a single display format is selected for a project.
This function is not supported by FXCPU.

### ■ Displaying programs in MELSAP3

Set the SFC display format to MELSAP3.

**Operation**

- Select [View] ⇒ [MELSAP3 Display].

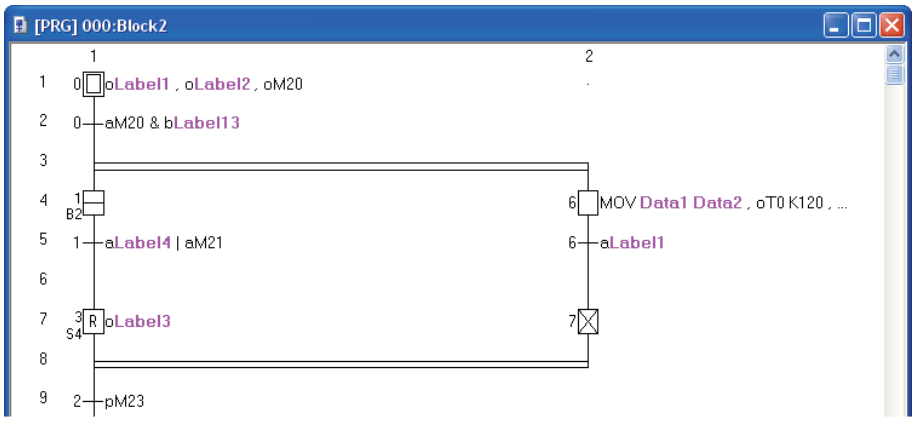


## ■ Displaying programs in MELSAP-L (instruction format)

Set the SFC display format to MELSAP-L (instruction format).

**Operation**

- Select [View] ⇒ [MELSAP-L (Instruction Format) Display].

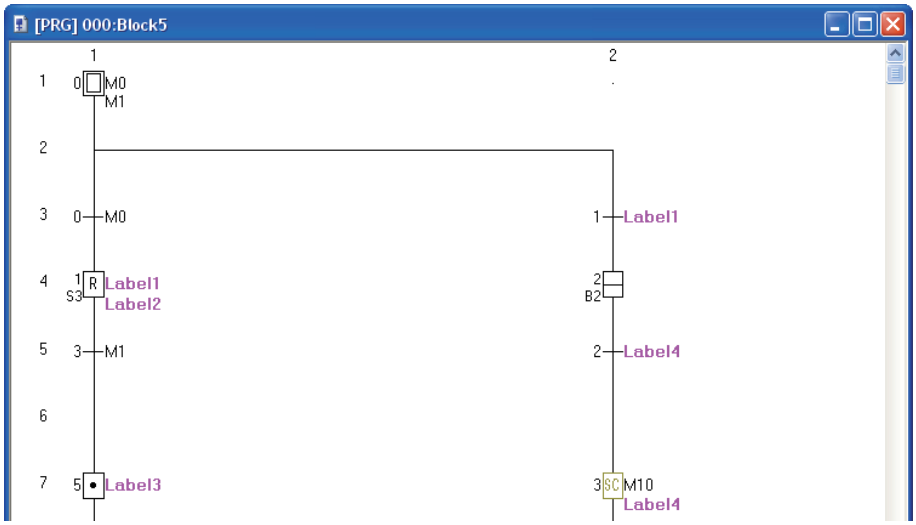



## ■ Displaying programs in MELSAP-L (start conditions format)

Set the SFC display format to MELSAP-L (start conditions format).

**Operation**

- Select [View] ⇒ [MELSAP-L (Start Conditions Format) Display].



# MEMO

# 3 PROGRAMMING PROCEDURE

This chapter explains a procedure for creating programs in Simple project.

3.1 Creating Programs . . . . . 3-2

# 3.1 Creating Programs

Q CPU L CPU FX

This section explains the general operating steps from the creation of a program in Simple project to the execution of the created program in the programmable controller CPU.

### 1. Creating a new project

| Procedure | Reference |
|---|---|
| Start up GX Works2. | GX Works2 Version 1 Operating Manual (Common) |
| Create a new Simple project.<br>To utilize an existing Simple project, open that Simple project. | |

⇩

### 2. Setting parameters

| Procedure | Reference |
|---|---|
| Set parameters. | GX Works2 Version 1 Operating Manual (Common) |
| Check parameters. | |

⇩

### 3. Setting labels (when using labels)*1

| Procedure | Reference |
|---|---|
| Define global labels. | Chapter 5 |
| Define local labels. | |

*1: For FXCPU, a project with labels does not support the SFC language.

⇩

### 4. Editing and converting/compiling programs (for ladder programs)

| Procedure | Reference |
|---|---|
| Edit ladder programs. | Chapter 6 |
| Convert programs. (For projects without labels) | Chapter 10 |
| Check programs. (For projects without labels) | |
| Compile a program, or compile all programs. (For projects with labels) | |

⇩

(To the next page)

(From the previous page)

## 5. Editing and converting/compiling programs (for SFC programs)

| Procedure | Reference |
|---|---|
| Edit SFC diagrams.<br>For FXCPU, enter a ladder block to turn ON the initial step. | Chapter 7 |
| Edit operation output programs and convert them. | Chapter 7, Chapter 10 |
| Edit transition condition programs and convert them. | |
| Set properties of SFC programs and SFC blocks. | Chapter 7 |
| Check programs. (For projects without labels) | Chapter 10 |
| Compile a program, or compile all programs. (For projects with labels) | |

## 6. Connecting a personal computer to the programmable controller CPU

| Procedure | Reference |
|---|---|
| Connect a personal computer to the programmable controller CPU. | GX Works2 Version 1 Operating Manual (Common) |
| Set the connection target. | |

## 7. Writing data to the programmable controller CPU

| Procedure | Reference |
|---|---|
| Write parameters to the programmable controller CPU. | Chapter 11 |
| Write sequence programs to the programmable controller CPU. | |

## 8. Checking the operation

| Procedure | Reference |
|---|---|
| Monitor the execution status of sequence programs. | Chapter 12 |

## 9. Ending the project

| Procedure | Reference |
|---|---|
| Save the project. | GX Works2 Version 1 Operating Manual (Common) |
| Exit GX Works2. | |

# MEMO

# 4 PROGRAM CONFIGURATIONS

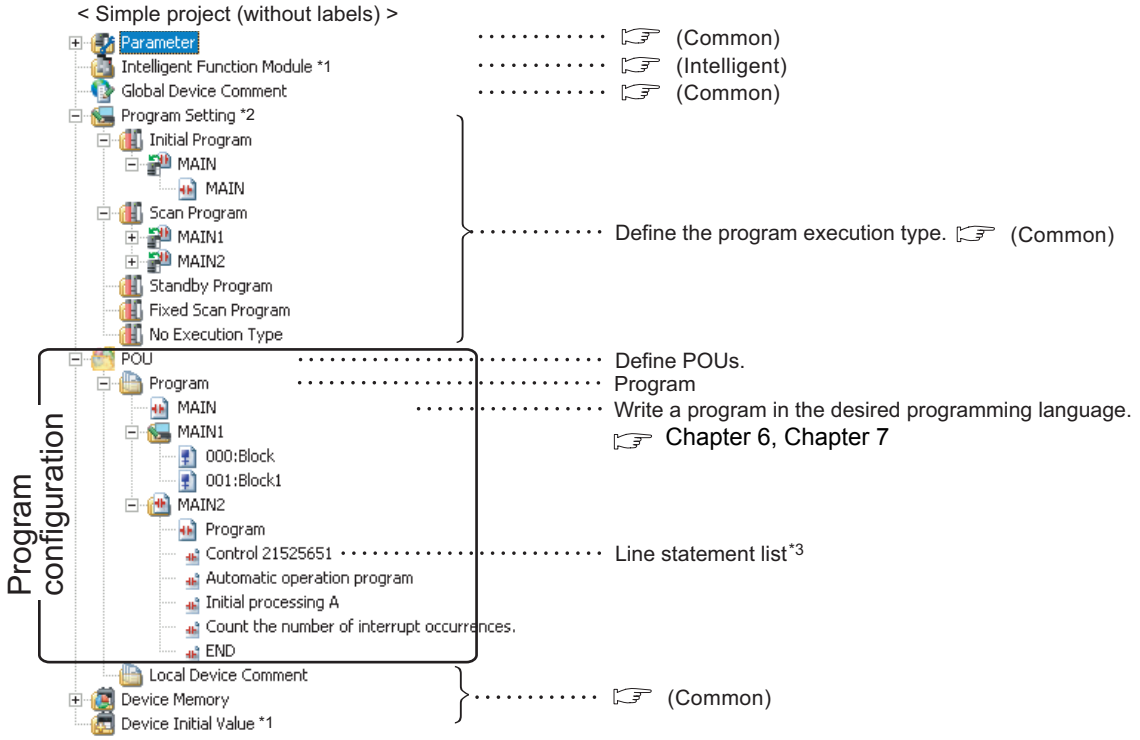
This chapter explains the program configurations of Simple project.

4.1 Program Configurations of Simple Project. . . . . 4-2

# 4.1 Program Configurations of Simple Project

Q CPU L CPU FX

This section explains the configurations of Simple project that are displayed in a tree format in the Project view.
The display contents differ according to the programmable controller type and the project type. The following is an example for QCPU (Q mode).
For (Common) and (Intelligent) indicated as the reference, refer to the following manuals respectively:
(Common) .....GX Works2 Version 1 Operating Manual (Common)
(Intelligent) .....GX Works2 Version 1 Operating Manual (Intelligent Function Module)

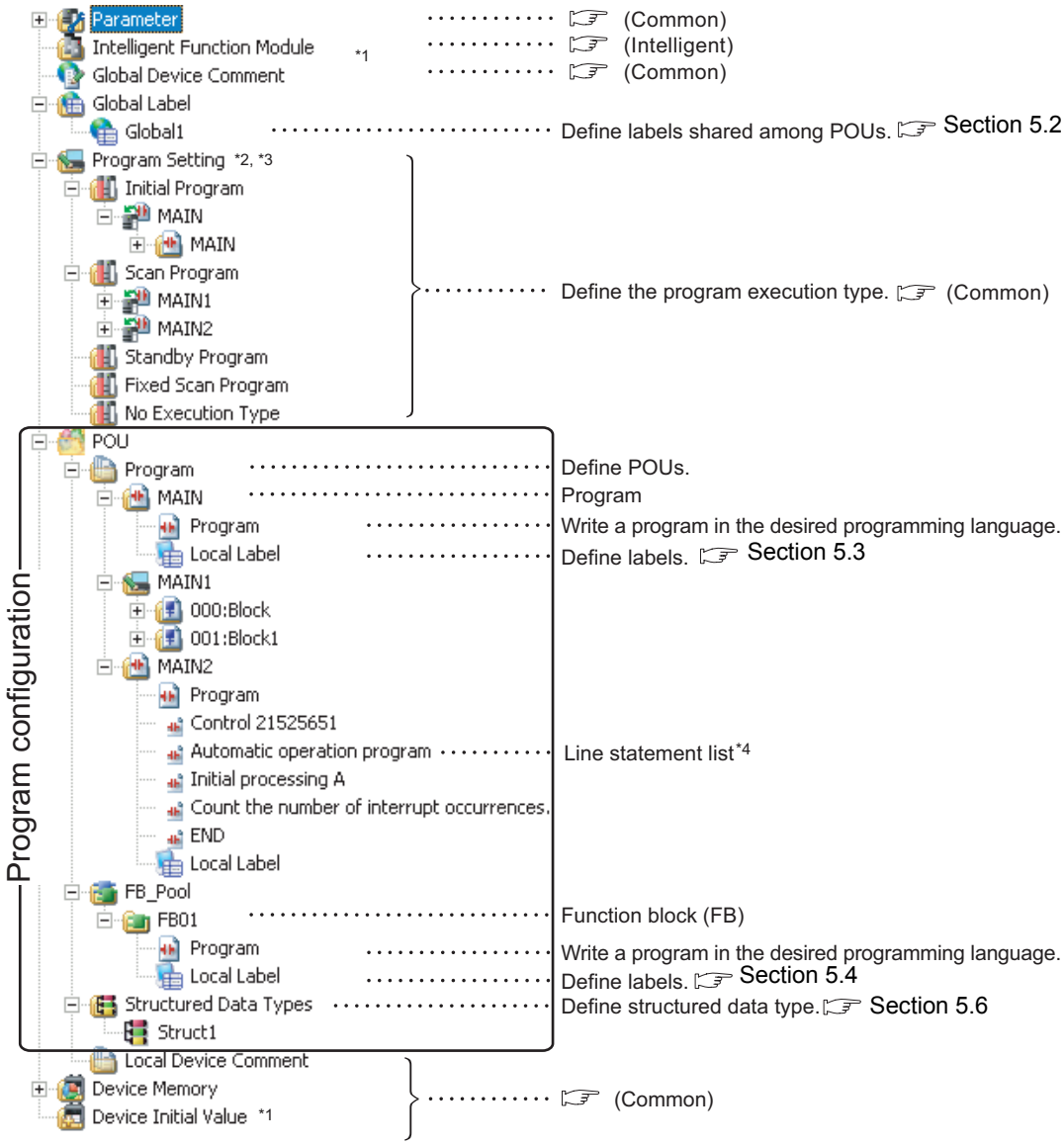



*1: For FXCPU, this item is not displayed.

*2: For FXCPU, no classification for program execution type. Only "Execution Program" is displayed.

*3 :When "Tree Display" is set for a line statement list, the line statement list is displayed on a tree view. (Section 9.5.1)

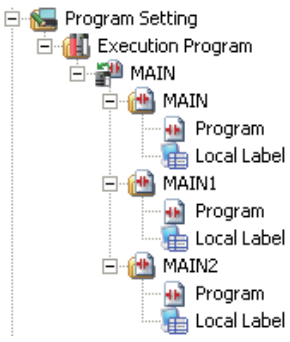
< Simple project (with labels) >




*1: For FXCPU, this item is not displayed.

*2: For FXCPU, no classification for program execution type. Only "Execution Program" is displayed.

*3: For FXCPU simple project (with labels), the "Execution Program" can be divided into multiple projects.




*4 :When "Tree Display" is set for a line statement list, the line statement list is displayed on a tree view. (Section 9.5.1)

# MEMO

# 5 SETTING LABELS

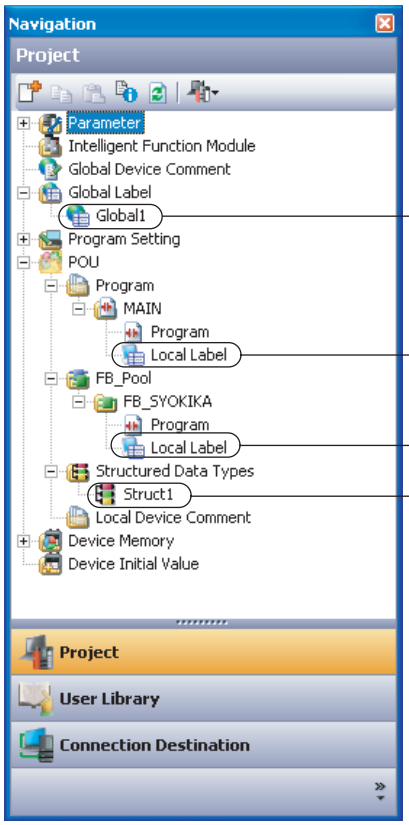
This chapter explains how to set labels.


**5.1 Label Setting Screens . . . . . 5-2**
**5.2 Setting Global Labels . . . . . 5-3**
**5.3 Setting Local Labels for Programs . . . . . 5-9**
**5.4 Setting Local Labels for Function Blocks . . . . . 5-11**
**5.5 Common Operations for Setting Labels . . . . . 5-13**
**5.6 Setting Structured Data Type Labels . . . . . 5-20**
**5.7 Setting Ranges for Devices Assigned Automatically . . . . . 5-26**
**5.8 Writing/Reading Data to/from CSV Files . . . . . 5-29**

# 5.1 Label Setting Screens

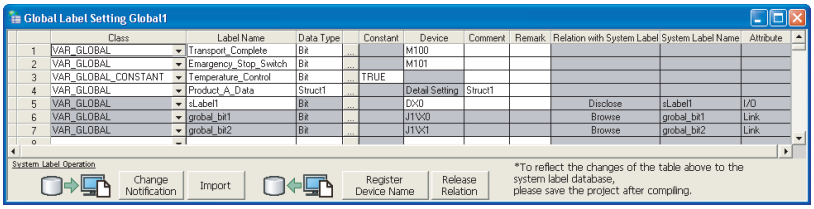
Q CPU L CPU FX

This section shows label setting screens.
When "Use Label" is selected on the New Project screen, labels are created as shown below.
Labels are set on each screen according to the type of label.
For FXCPU, a project with labels does not support the SFC language.



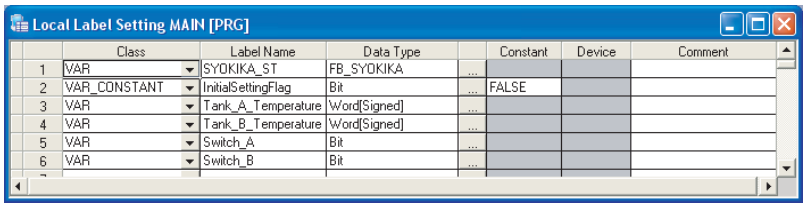

Global Label Setting screen

Define labels that can be used for all sequence programs in the project. (☞ Section 5.2)



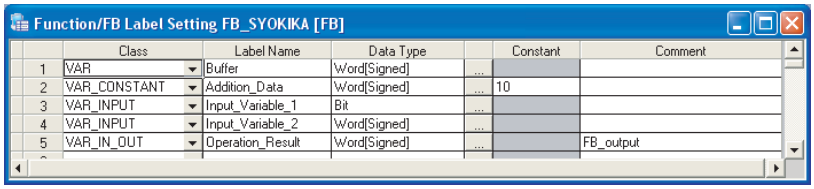

Local Label Setting screen

Define labels that can be used only for each sequence program. (☞ Section 5.3)



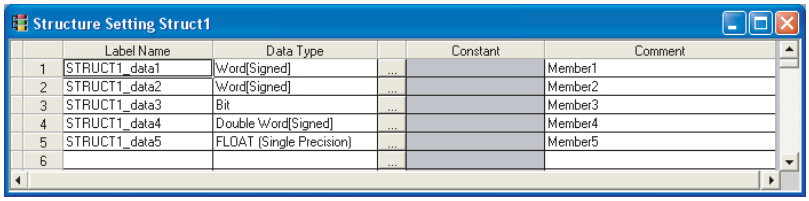

Function/FB Label Setting screen

Define labels that can be used only for function blocks. (☞ Section 5.4)




Structure Setting screen

Define structured data types to be used in the label setting. (☞ Section 5.6.1)



# 5.2 Setting Global Labels

Q CPU L CPU FX

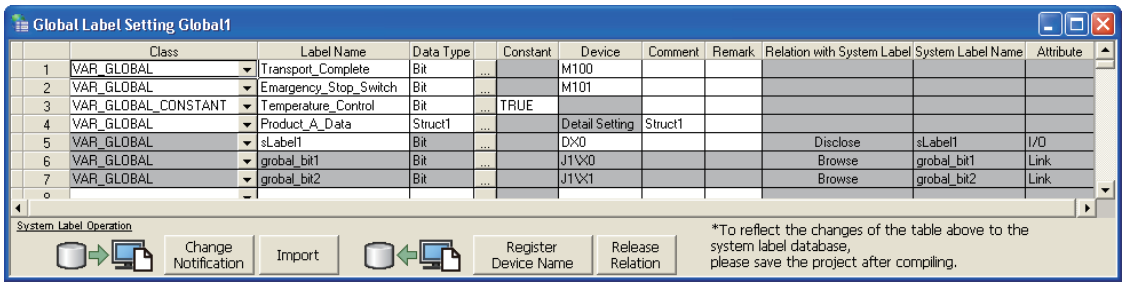
This section explains how to set global labels.
Global labels can be used in iQ Works supported products (GX Works2, MT Developer2, GT Designer3) by registering them as system labels.
For details of system labels, refer to the following manual.
(☞ iQ Works Beginner's Manual)

**Point**

- **System labels**
  Same label names can be used in programming among GX Works2, MT Developer2, and GT Designer3 by using system labels.
- **System label data base**
  A system label data base is a data base to manage system labels.
  A system label data base is created in the workspace when the workspace is saved in MELSOFT Navigator.
  System labels cannot be used in the workspace which does not contain a system label data base.

## Screen display

Select Project view ⇒ "Global Label" ⇒ "(global label)".



## Operating procedure

- Set the items on the screen.

| Item | Description | Maximum number of characters |
|---|---|---|
| Class | Select a label class from the list displayed by clicking ▼. (☞ Section 5.5.1) | – |
| Label Name | Enter a desired label name. | Ladder/ST/SFC: 32<br>(FB instance name: 16) |
| Data Type | Specify a data type from the Data Type Selection screen displayed by clicking [...]. (☞ Section 5.5.3)<br>It can also be entered directly. | 128 |
| Constant | Enter a constant value when "VAR_GLOBAL_CONSTANT" is selected for "Class" and simple type is selected for "Data Type". | 128 |
| Device | Set a specific device to be assigned to the label when "VAR_GLOBAL" is selected for "Class".<br>• A device is automatically assigned when the cell is blank.<br>• When the data type is Structure, click the "Detail Setting" cell and set devices on the Structure Device Setting screen. (☞ Section 5.6.3) | 50 |
| Comment*1,*2 | Enter a label comment.<br>Comments can be displayed on the program editor by switching display/hide of comments. (☞ Section 2.2.4) | 1024 |
| Remark*1,*2 | Enter supplementary information for label comments.<br>This item is not displayed on the program editor. | 1024 |
| Relation with System Label*3 | Displays the relation between the global label and system label.<br>Class: Disclose — The global label is disclosed as a system label.<br>Class: Browse — The global label refers the system label which is disclosed by another project.<br>Class: Blank — There is no relation with a system label. | – |
| System Label Name*3 | Displays the name of the system label which relates to the global label. | – |
| Attribute*3 | Displays the attribute of the system label which relates to the global label. | – |

*1: A new line can be inserted in a cell by pressing the Ctrl + Enter keys.

*2 :The compilation is not needed after editing.

*3: For FXCPU, these items are supported by FX3G, FX3U and FX3UC only.

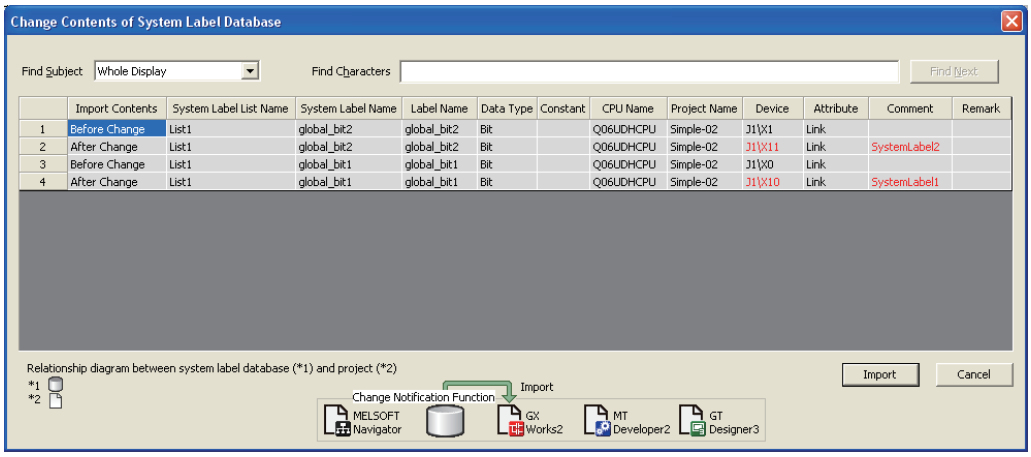
## Screen button

● Change Notification **(For FXCPU, this button is supported by FX3G, FX3U and FX3UC only)**

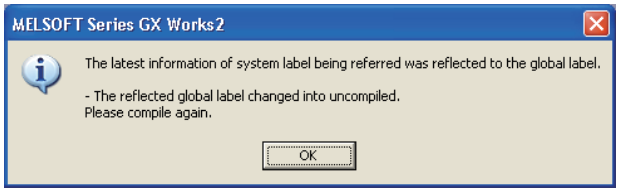
Updates the system label information.

### Operation

1. Click the Change Notification button.
   The Change Contents of System Label Database screen is displayed.




2. Click the Import button.
   The information on the changed system labels are applied to the project.
   When the Cancel button is clicked, these changes will be updated at the next update.
3. The following message is displayed.




4. Click the OK button.

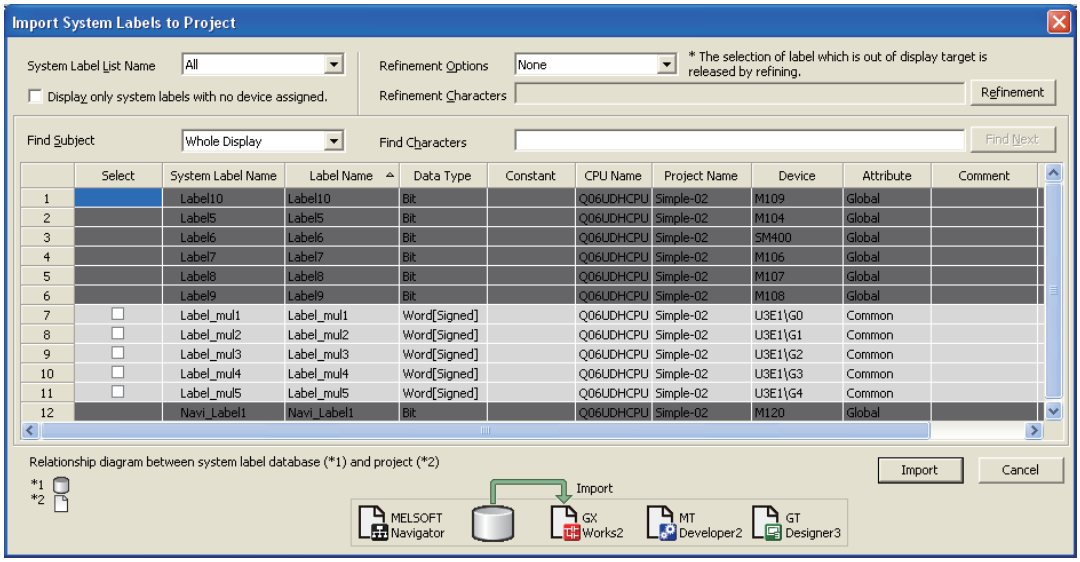
● Import **(For FXCPU, this button is supported by FX3G, FX3U and FX3UC only)**

Imports system labels to the project.

**Operation**

1. Click the Import button.

   The Import System Labels to Project screen is displayed.




2. Check "Select" of a system label to import to the project.
3. Click the Import button.
4. The following message is displayed.



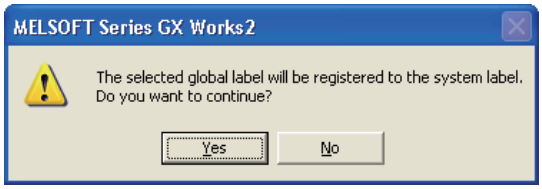

5. Click the OK button.

● Register Device Name **(For FXCPU, this button is supported by FX3G, FX3U and FX3UC only)**

Registers a global label as a system label.

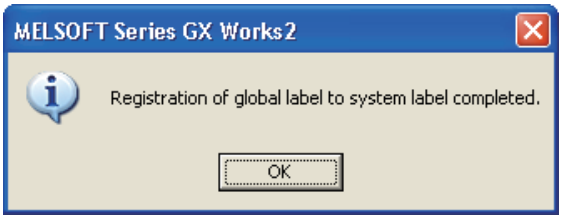
**Operation**

1. Select a global label to register as a system label.
2. Click the Register Device Name button.
3. The following message is displayed.




4. Click the Yes button.

5. The following message is displayed.



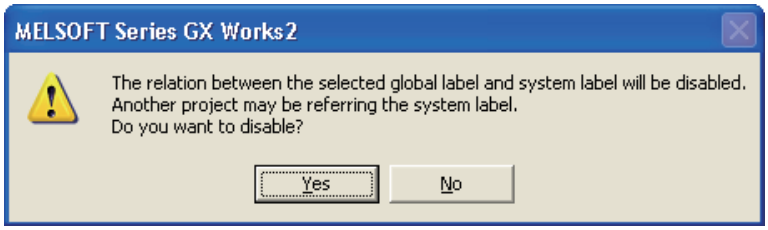

6. Click the OK button.

● Release Relation **(For FXCPU, this button is supported by FX3G, FX3U and FX3UC only)**

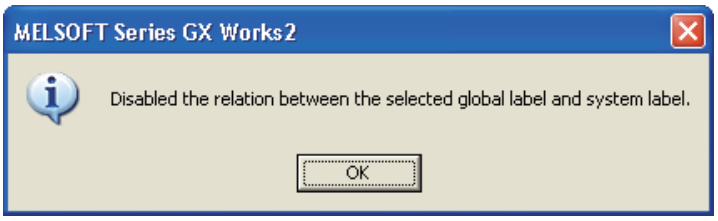
Disables the relation between a global label and system label.
After the relation with the system label is disabled, the global label becomes a normal global label.

**Operation**

1. Select a global label to disable its relation with a system label.
2. Click the Release Relation button.
3. The following message is displayed.




4. Click the Yes button.
5. The following message is displayed.




6. Click the OK button.

**Point**

- **Class setting**
  When an item other than the class, such as a label name or data type, is set in a blank column, "VAR_GLOBAL" is automatically set for "Class". Change it if necessary.
- **Characters that can be used for label names**
  Any of the following label names causes an error at compilation.
  - A label name that includes a space.
  - A label name that begins with a numeral.
  - A label name which is same as the one used for devices.

  For characters that cannot be used for label names, refer to the following manual.
  ☞ GX Works2 Version 1 Operating Manual (Common)
- **Specifying devices/addresses**
  The digit-specified bit device (K4M0) or bit-specified word device (D0.1) can be specified for devices/addresses.
- **Assigning devices automatically**
  Devices are automatically assigned to labels which are not set devices when compiling a program. The device assignment range can be changed on the Device/Label Automatic-Assign Setting screen. (☞ Section 5.7)
  The assigned devices can be checked with the cross reference function.
  (☞ GX Works2 Version 1 Operating Manual (Common))
- **System label**
  - System labels whose "Attribute" is set to "Common" are not supported by LCPU.
  - System labels whose "Attribute" is set to "Common" or "Link" are not supported by FXCPU.
  - Importing system labels with MELSOFT Navigator may cause an error at compilation with GX Works2.

  Check the corresponding error location and correct the error as instructed by the error message displayed on the output window.

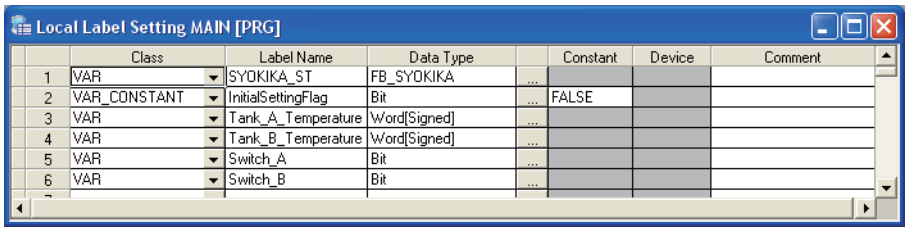
# 5.3 Setting Local Labels for Programs

Q CPU L CPU FX

This section explains how to set local labels used for each program.

## Screen display

Select Project view ⇒ "POU" ⇒ "Program" ⇒ "(program)" ⇒ "Local Label".




## Operating procedure

- Set the items on the screen.

| Item | Description | Maximum number of characters |
|---|---|---|
| Class | Select a label class from the list displayed by clicking ▼. (☞ Section 5.5.1) | – |
| Label Name | Enter a desired label name. | Ladder/ST/SFC: 32 (FB instance name: 16) |
| Data Type | Specify a data type from the Data Type Selection screen displayed by clicking [...]. (☞ Section 5.5.3) It can also be entered directly. | 128 |
| Constant | Enter a constant value when "VAR_CONSTANT" is selected for "Class" and simple type is selected for "Data Type". | 128 |
| Device | This item cannot be set for local labels. When the data type is Structure, click the "Detail Setting" cell and set devices on the Structure Device Setting screen. (☞ Section 5.6.3) | – |
| Comment*1,*2 | Enter a comment. Comments can be displayed on the program editor by switching display/hide of comments. (☞ Section 2.2.4) | 1024 |

*1: A new line can be inserted in a cell by pressing the Ctrl + Enter keys.

*2 :The compilation is not needed after editing.

**Point**

● **Class setting**
When an item other than the class, such as a label name or data type, is set in a blank column, "VAR" is automatically set for "Class". Change it if necessary.

● **Characters that can be used for label names**
Any of the following label names causes an error at compilation.
- A label name that includes a space.
- A label name that begins with a numeral.
- A label name which is same as the one used for devices.

For characters that cannot be used for label names, refer to the following manual.
(☞ GX Works2 Version 1 Operating Manual (Common))

● **Assigning devices automatically**
Devices are automatically assigned to labels when a program is compiled. The device assignment range can be changed on the Device/Label Automatic-Assign Setting screen. (☞ Section 5.7)
The assigned devices can be checked with the cross reference function.
(☞ GX Works2 Version 1 Operating Manual (Common))

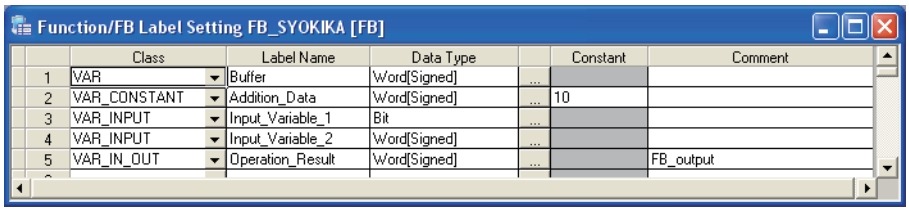
# 5.4 Setting Local Labels for Function Blocks

Q CPU L CPU FX

This section explains how to set local labels for each function block.
Create a new function block in advance.
For the method for creating new function blocks, refer to the following manual.
☞ GX Works2 Version 1 Operating Manual (Common)

## Screen display

Select Project view ⇒ "POU" ⇒ "FB_Pool" ⇒ "(function block)" ⇒ "Local Label".




## Operating procedure

- Set the items on the screen.

| Item | Description | Maximum number of characters |
|---|---|---|
| Class | Select a label class from the list displayed by clicking ▼. (☞ Section 5.5.1) | – |
| Label Name | Enter a desired label name. | Ladder/ST/SFC: 32 (Input/output label: 16) |
| Data Type | Specify a data type from the Data Type Selection screen displayed by clicking [...]. (☞ Section 5.5.3) It can also be entered directly. | 128 |
| Constant | Enter a constant value when "VAR_CONSTANT" is selected for "Class" and simple type is selected for "Data Type". | 128 |
| Comment*1,*2 | Enter a comment. Comments can be displayed on the program editor by switching display/hide of comments. (☞ Section 2.2.4) | 1024 |

*1: A new line can be inserted in a cell by pressing the Ctrl + Enter keys.

*2 :The compilation is not needed after editing.

**Point**

- **When label setting is changed after utilizing function blocks**
  When the label setting of function block which is utilized to the ladder is changed, compile the program or all programs. The change of input/output label is applied to the ladder.
  Note that the change is not applied when the FB instance is not registered in the global label setting or local label setting.
- **Class setting**
  When an item other than the class, such as a label name or data type, is set in a blank column, "VAR" is automatically set for "Class". Change it if necessary.
- **Characters that can be used for label names**
  Any of the following label names causes an error at compilation.
  • A label name that includes a space.
  • A label name that begins with a numeral.
  • A label name which is same as the one used for devices.
  For characters that cannot be used for label names, refer to the following manual.
  ☞ GX Works2 Version 1 Operating Manual (Common)
- **Assigning devices automatically**
  Devices are automatically assigned to labels when a program is compiled. The device assignment range can be changed on the Device/Label Automatic-Assign Setting screen. (☞ Section 5.7)
  The assigned devices can be checked with the cross reference function.
  (☞ GX Works2 Version 1 Operating Manual (Common))

## ■ Maximum number of input/output labels

The maximum number of input/output labels can be used in a function block differs depending on programming languages.
When setting input/output labels with local label setting of function block, set within the number of the input/output labels shown in the following table.

| Programming language | Function block | |
|---|---|---|
| | Input | Output |
| Ladder language | 1 to 24*1 (Including I/O labels) | 1 to 24*1 (Including I/O labels) |
| ST language | 0 to 253 (Including I/O labels) | |

*1 : The I/O label is counted that each of input /output labels is one label.

# 5.5 Common Operations for Setting Labels

Q CPU L CPU FX

This section explains the common operations for each label setting editor.

## 5.5.1 Classes

Label classes indicate which POU and how can the label be used.
Selectable labels are different according to the type of label setting editor.
The following table shows selectable labels for each label setting editor.

○:Applicable, ×: Not applicable

| Class | Description | Type of usable label setting editor | | |
|---|---|---|---|---|
| | | Global label | Local label | Function block label |
| VAR_GLOBAL | A common label that can be used for programs and function blocks. | ○ | × | × |
| VAR_GLOBAL_ CONSTANT | A common label with a constant value that can be used for programs and function blocks. | ○ | × | × |
| VAR | A label that can be used for programs and function blocks. | × | ○ | ○ |
| VAR_CONSTANT | A label with a constant value that can be used for programs and function blocks. | × | ○ | ○ |
| VAR_RETAIN*1 | A latch-type label that is used within the range of declared program and function block. | × | ○ | ○ |
| VAR_INPUT | A label that is used for an input of function block. Its value cannot be changed in a POU | × | × | ○ |
| VAR_OUTPUT | A label that is used for an output of function block. | × | × | ○ |
| VAR_IN_OUT | A label that can be used for both input and output of function block with the same name. Its value can be changed in a POU. | × | × | ○ |

*1: Not supported by FXCPU

## 5.5.2 Data types

Label data types are described in the following table.
For details such as value ranges of each data type, refer to the following manuals.
☞ MELSEC-Q/L/F Structured Programming Manual (Fundamentals)
☞ MELSEC-Q/L Programming Manual (Common Instruction)
☞ User's Manual (Function Explanation, Program Fundamentals) of the CPU module to be used.

Note that data types are different according to the programming language (ladder, SFC, ST).
The following table shows data types that can be used for each programming language.

○: Applicable, ×: Not applicable

| Data type | Programming language | |
|---|---|---|
| | Ladder/SFC | ST |
| Bit | ○ | ○ |
| Word (signed) | ○ | ○ |
| Double word (signed) | ○ | ○ |
| Word (unsigned)/16-bit string | × | ○ |
| Double word (unsigned)/32-bit string | × | ○ |
| Single-precision real*1 | ○ | ○ |
| Double-precision real*2 | ○ | ○ |
| String*3 | ○ | ○ |
| Time | × | ○ |
| Timer | ○*5 | × |
| Counter | ○*5 | × |
| Retentive timer*4 | ○*5 | × |
| Pointer | ○*5 | × |

*1: For FXCPU, this item is supported by FX2N, FX2NC, FX3G, FX3U and FX3UC only.

*2: Supported by Universal model QCPU/LCPU only.

*3: For FXCPU, this item is supported by FX3U and FX3UC only.

*4: For FXCPU, this item is supported by FX1N, FX1NC, FX2N, FX2NC, FX3G, FX3U and FX3UC only.

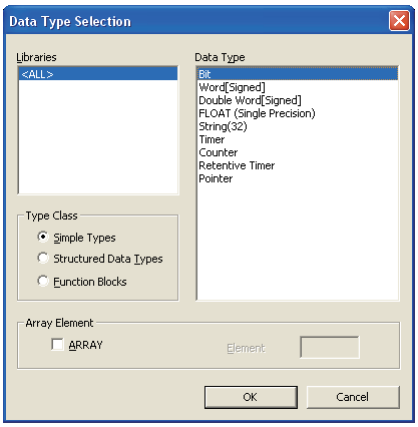
*5: For ladder language, these items cannot be used in an inline structured text program.

## 5.5.3 Selecting data types

Select a data type.
To define a label, a data type must be specified by directly entering the type in text or selecting it on the Data Type Selection screen.

### Screen display

Click [...] in the data type entry field on each label setting screen.




### Operating procedure

1. **Select a type in the "Type Class".**

| Item | Description |
|---|---|
| Simple Types | Specify this to select a data type from basic types such as bit and word. |
| Structured Data Types | Specify this to select a data type from the defined structures.<br>(Not displayed for the structure settings) |
| Function Blocks | Specify this to select a data type from the defined function blocks.<br>(Not displayed for the FB label settings/structure settings) |

2. **In the "Libraries" field, select the reference source such as the defined structure that is used as the data type.**

| Item | Description |
|---|---|
| <ALL> | Browse data types and structures/function blocks defined in the project, and all libraries. |
| <Project> | Browse data types and structures/function blocks defined in the project.<br>(Not displayed when "Simple Types" is selected.) |

3. **In the "Data Type" field, select the data type, structure, or function block name.**

4. **Click the [OK] button when the setting is completed.**
   The settings are displayed in the "Data Type" column on the label setting screen.

**Point**

● **Method for displaying the Data Type Selection screen**
The Data Type Selection screen can be opened by any of the following operations when [...] is in the selected status.

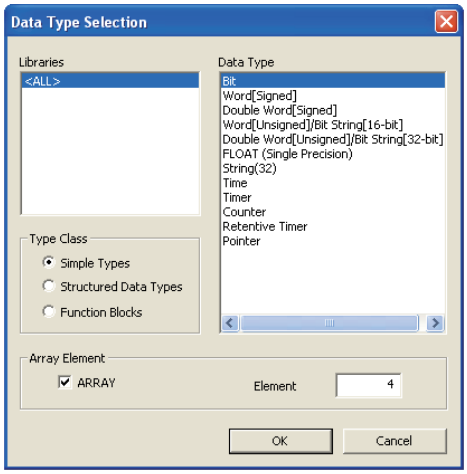
- Press the [Enter] key.
- Press the [Space] key.
- Press the [F2] key.

## ■ Setting arrays for data type

Define the data type as an array.
To define a data type as an array, set the items in the "Array Element" field on the Data Type Selection screen.

**Operation**

1. Click [...] in the data type entry field on each label setting screen.
2. Check the check box in the "Array Element" field.
3. Enter the number of elements in the "Element" field.
4. Set the data type of the array element in the same manner as setting the normal data type.




● To change the offset

To change the offset ([Array start value]..[Array end value]) to a value other than 0, edit the offset value by directly entering the array type declaration in text on each label setting screen.

| | Class | Label Name | Data Type | |
|---|---|---|---|---|
| 1 | VAR_GLOBAL | Initial Setting_A | Bit[0..2] | ... |
| 2 | VAR_GLOBAL | Initial Setting_B | Bit[2..6] | ... |
| 3 | VAR_GLOBAL | Initial Setting_C | String(32) | ... |

● To change the array to a two- or three-dimensional array

Edit two- or three-dimensional array by directly entering the array type declaration in text on each label setting screen.

| | Class | Label Name | Data Type | |
|---|---|---|---|---|
| 1 | VAR_GLOBAL | Initial Setting_A | Bit[0..2] | ... |
| 2 | VAR_GLOBAL | Initial Setting_B | Bit[2..6,2..6] | ... |
| 3 | VAR_GLOBAL | Initial Setting_C | Bit[0..2,0..2,0..2] | ... |

**Point**

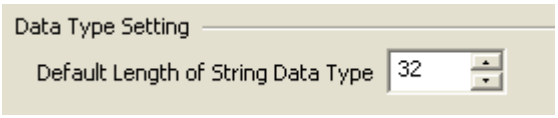
- **When a constant type is set for Class**
  For labels whose classes are set as VAR_CONSTANT or VAR_GLOBAL_CONSTANT, arrays cannot be set for the data type. If they are set, an error occurs at compilation.
- **Offset values**
  Minus values can be set for offset values.
- **Using arrays in the ladder**
  The labels of two- or three-dimensional array and structure array type cannot be used in the ladder.

## ■ Setting data length of character string data type

Set the data length of the character string data type.
To change the data length of the character string data type, directly edit the data length on each label setting screen.
The initial value of data length of the character string data type is set in the option setting.

**Operation**

- Select [Tool] ⇒ [Options] ⇒ "Label Setting Editor" ⇒ "Default Length of String Date Type", and set the data length.



## 5.5.4 Editing rows

Edit rows on the label setting screen.

### ■ Adding rows

Add a row on the label setting screen.

● New Declaration (Before)

This function inserts a row above the selected row.

**Operation**

• Select [Edit] ⇒ [New Declaration (Before)] ( ).

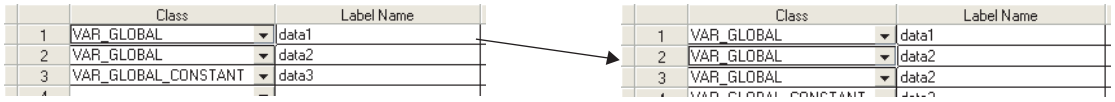



● New Declaration (After)

This function inserts a row below the selected row.

**Operation**

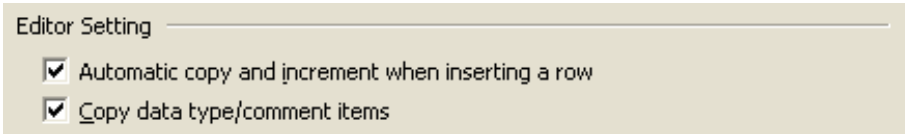
• Select [Edit] ⇒ [New Declaration (After)] ( ).




**Point**

● **Adding rows**

When using the New Declaration (After) function, the setting of added rows can be specified whether to leave cells blank or to enter label names or data types automatically.
Select [Tool] ⇒ [Options] ⇒ "Label Setting Editor".

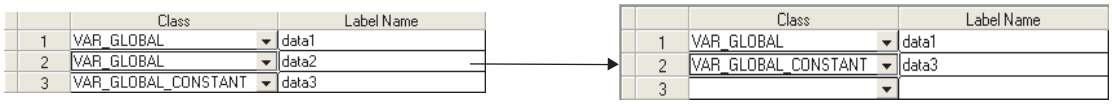



### ■ Deleting rows

Delete a row on the label setting screen.

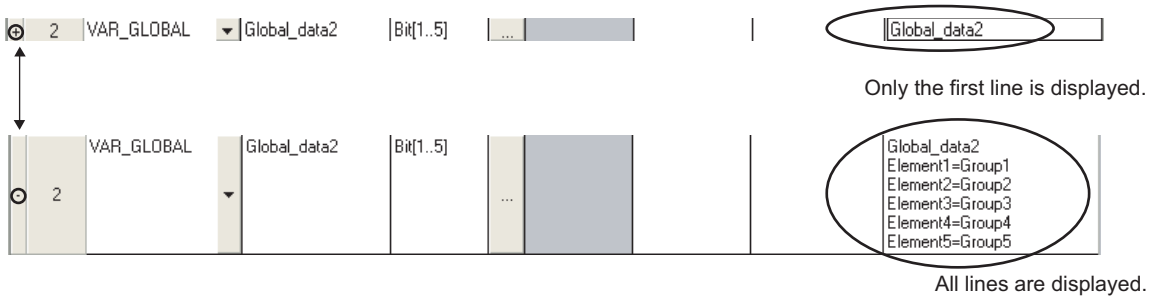
**Operation**

• Select [Edit] ⇒ [Delete Line] ( ).



## ■ Displaying all lines or first line of comments and remarks

For the "Comment" and "Remark" columns, data can be entered in multiple lines. The 'all lines/first line display' function switches the display between all lines and only the first line by double-clicking " + " or " - ".

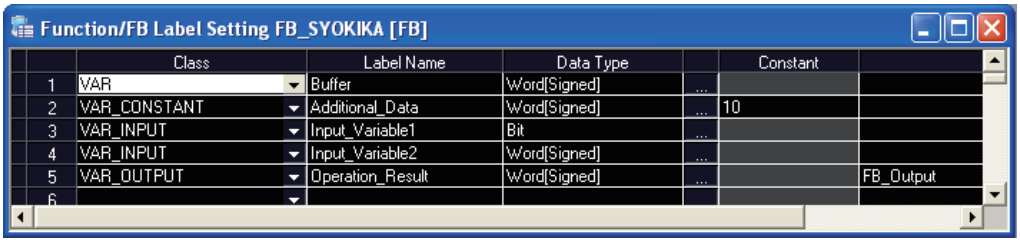



## ■ Selecting all rows

All rows can be selected by the following operation.

**Operation**

- Select [Edit] ⇒ [Select All].



# 5.6 Setting Structured Data Type Labels

Q CPU L CPU FX

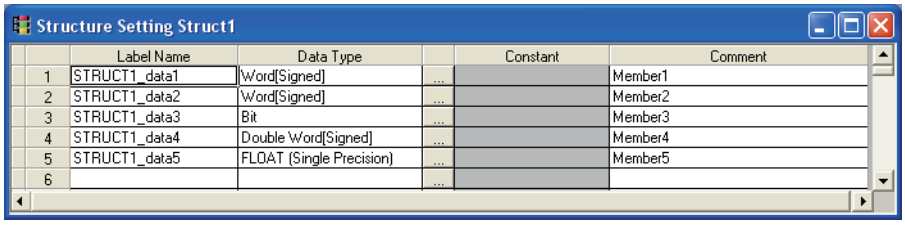
This section explains how to set structured data type labels.

## 5.6.1 Setting data type of structure

Set the elements of the structure on the Structure Setting screen.

### Screen display

Select Project view ⇒ "POU" ⇒ "Structured Data Types" ⇒ "(structure)".




### Operating procedure

- Set the items on the screen.

| Item | Description | Maximum number of characters |
|---|---|---|
| Label Name | Enter a desired label name. | 32 |
| Data Type | Specify a data type from the Data Type Selection screen displayed by clicking [...]. (☞ Section 5.5.3)<br>It can also be entered directly. | 128 |
| Constant | Display the constant value of the selected type. | 128 |
| Comment | Enter comments.<br>A new line can be inserted in a cell by pressing the Ctrl + Enter keys. | 1024 |

**Point**

● **Creating new structured data**
Create structured data using the Project view.
(☞ GX Works2 Version 1 Operation Manual (Common))

## 5.6.2 Setting data type as structure

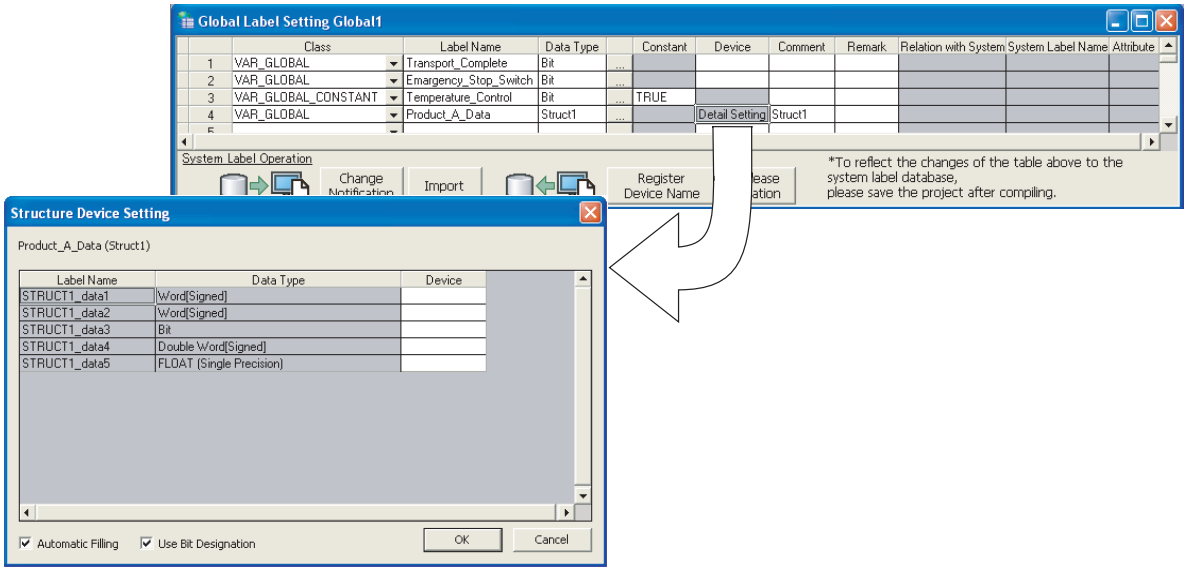
To define the data type of label as a structure, set a structure in the data type entry field on each label setting screen. In addition to direct text entry, a structure can be selected on the Data Type Selection screen ( ☞ Section 5.5.3).

## 5.6.3 Assigning devices to structured data type labels

Devices of the structured data type global labels are set on the Structure Device Setting screen.
If the structure is set for data type on the Global Label Setting screen, "Detail Setting" is displayed in the "Device" column. Click "Detail Setting" to display the Structure Device Setting screen.

### Screen display

Click "Detail Setting" on the label setting screen.




### Operating procedure

- Set the items on the screen.

| Item | Description |
|---|---|
| Label Name | Display label names defined as structure. |
| Data Type | Display data types set to label names. |
| Device | Set device names to be assigned. |
| Automatic Filling | Check this to set devices automatically to cells in which devices are not set with the same data type. |
| Use Bit Designation | Check this to specify a bit device of word device. |

**Point**

● **Display on the Local Label Setting screen**
For the Structure Device Setting screen, the read-only screen is displayed.

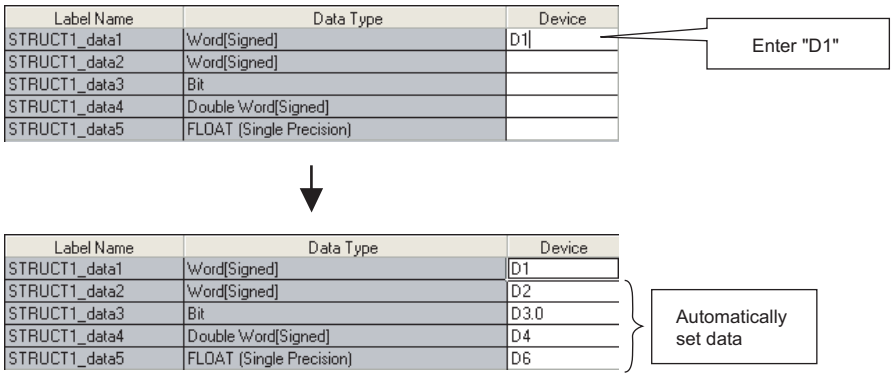
## ■ Entering device names automatically

The Automatic filling function can be used when setting series of devices for the same data type data on the Structure Device Setting screen.
When using the Automatic filling function, whether to use bit specification of word device can be selected.

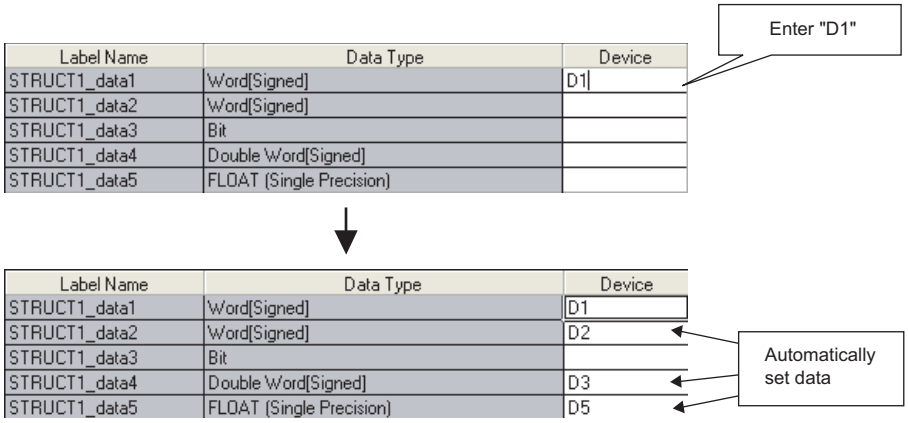
**Operation**

1. Click "Detail Setting" on the label setting screen.
   The Structure Device Setting screen is displayed.
2. Enter the device name to the "Device" column.
   Series of devices are automatically set in the cells following the one entered, skipping the cells where devices are already set.

● When using bit specification




● When not using bit specification




**Point**

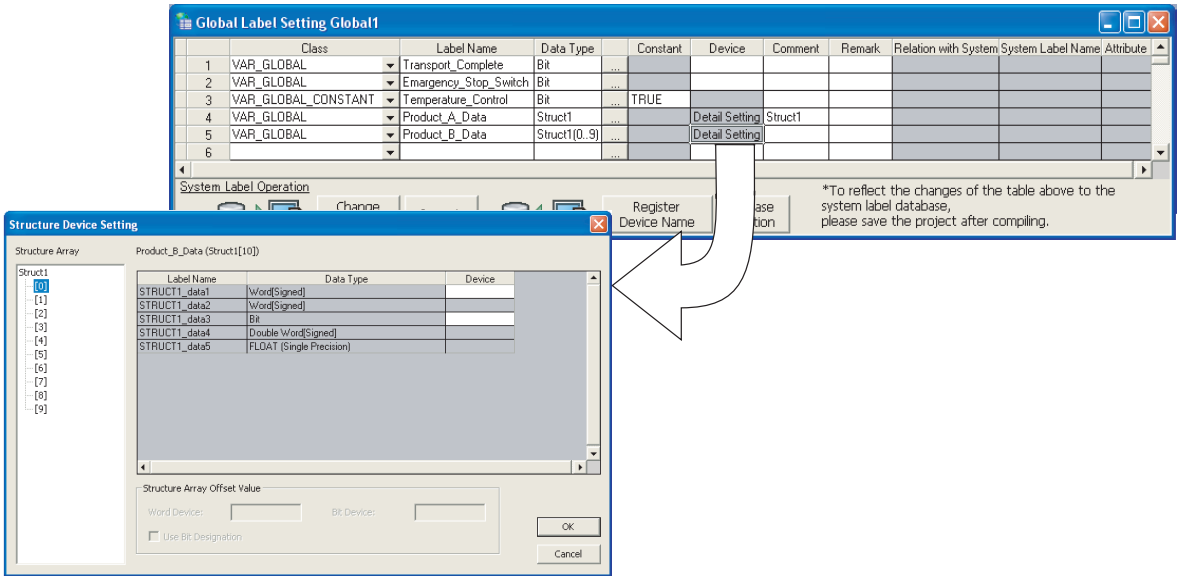
● **When not using bit specification**
When the bit specification is not used, uncheck the "Use Bit Designation" item on the Structure Device Setting screen.

## 5.6.4 Assigning devices to structure array type labels

Set devices for structure array type global labels on the Structure Device Setting screen.
When VAR_GLOBAL is set for "Class" and the structure array is set for "Data Type" on the Global Label Setting screen, "Detail Setting" is displayed in the "Device" column. Click "Detail Setting" to display the Structure Device Setting screen.

### Screen display

Click "Detail Setting" on the label setting screen.




### Operating procedure

- Set the items on the screen.

| Item | | Description |
|---|---|---|
| Structure Array | | Display elements of the structure array in tree format.<br>The device setting of the element selected in the tree is displayed in the right area of the screen. |
| Label Name | | Display label names defined as structure. |
| Data Type | | Display data types set to data names. |
| Device | | Set device names to be assigned.<br>Device names can be entered for the start array element only.<br>For the subsequent array elements, device names offset from the device number set for the start element are automatically set. |
| Structure Array Offset Value | Word Device/Bit Device | Specify the device offset value to be set to the same data type cells in the array element. |
| | Use Bit Designation | Check this to specify a bit device of word device. |

**Point**

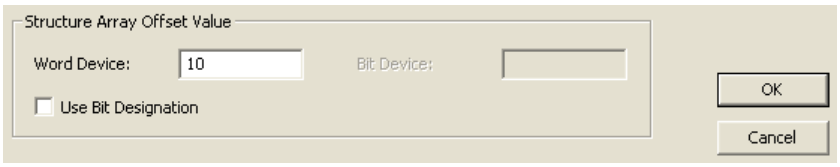
● **Display on the Local Label Setting screen**
For the Structure Device Setting screen, the read-only screen is displayed.

## ■ Entering device names automatically by setting offset values

On the Structure Device Setting screen, device numbers to be entered automatically can be set in fixed spacing for each array element of the structure array. Specify the difference in device numbers between the array elements as an offset value for the start device of the same data type.

**Operation**

1. Click "Detail Setting" on the label setting screen.
   The Structure Device Setting screen is displayed.
2. Set the "Structure Array Offset Value".




3. Set the device name for the start element data of the array.
   Devices are set to the same data type of the array elements on the screen.

・ Offset value is not specified.

<Array [0]>

| Label Name | Data Type | Device |
|---|---|---|
| STRUCT1_data1 | Word[Signed] | D1 |
| STRUCT1_data2 | Word[Signed] | D2 |
| STRUCT1_data3 | Bit | |
| STRUCT1_data4 | Double Word[Signed] | D3 |
| STRUCT1_data5 | FLOAT (Single Precision) | D5 |

Enter "D1"

<Array [1]>

| Label Name | Data Type | Device |
|---|---|---|
| STRUCT1_data1 | Word[Signed] | D7 |
| STRUCT1_data2 | Word[Signed] | D8 |
| STRUCT1_data3 | Bit | |
| STRUCT1_data4 | Double Word[Signed] | D9 |
| STRUCT1_data5 | FLOAT (Single Precision) | D11 |

Devices starting from "D7" are assigned.

・ Offset value is 10.

<Array [0]>

| Label Name | Data Type | Device |
|---|---|---|
| STRUCT1_data1 | Word[Signed] | D1 |
| STRUCT1_data2 | Word[Signed] | D2 |
| STRUCT1_data3 | Bit | |
| STRUCT1_data4 | Double Word[Signed] | D3 |
| STRUCT1_data5 | FLOAT (Single Precision) | D5 |

Enter "D1"

<Array [1]>

| Label Name | Data Type | Device |
|---|---|---|
| STRUCT1_data1 | Word[Signed] | D11 |
| STRUCT1_data2 | Word[Signed] | D12 |
| STRUCT1_data3 | Bit | |
| STRUCT1_data4 | Double Word[Signed] | D13 |
| STRUCT1_data5 | FLOAT (Single Precision) | D15 |

Devices starting from "D11" are assigned.

● Using bit specification

Devices can be set by specifying a bit device of word device when entering devices automatically.

**Operation**

1. Click "Detail Setting" on the label setting screen.
   The Structure Device Setting screen is displayed.
2. Check the "Use Bit Designation" item.
3. Set the device name for the start element data of the array.
   Devices are set to the same data type or bit device data type.

**Point**

● **Data for which device name can be entered**
For the structure array type, a device name can be entered only for the start element of array.
For the subsequent array elements, device names offset from the device number set for the start element are automatically set.

● **Offset values**
- An expression such as '1\2' can be specified for an incremental value of device such as U0\G0.
- When 0 is specified for the incremental value, the device number same as the data set to the start of devices is set to all data in the array.

# 5.7 Setting Ranges for Devices Assigned Automatically

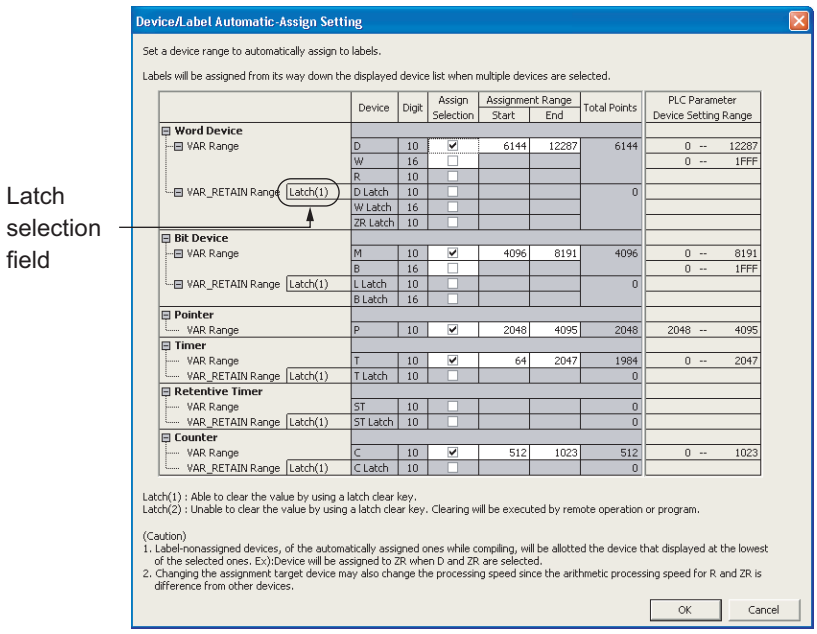
Q CPU L CPU FX

This section explains how to set the ranges for devices that are automatically assigned to local labels.
The devices set as automatically assigned device are assigned to labels during compilation.
(☞ Section 10.3)

## ■ QCPU (Q mode)/LCPU

### Screen display

Select [Tool] ⇒ [Device/Label Automatic-Assign Setting].




### Operating procedure

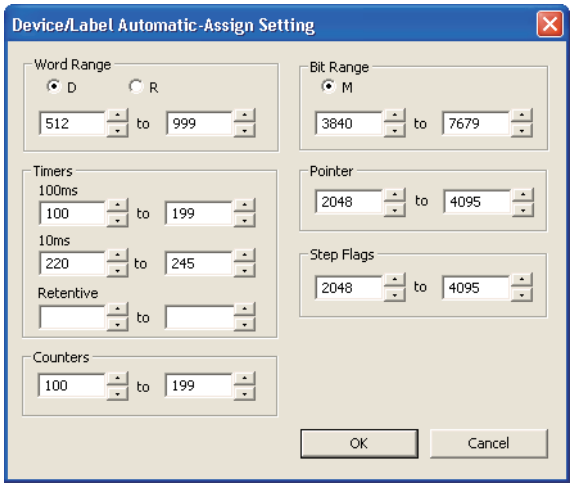
- Set the items on the screen.

| Item | | Description |
|---|---|---|
| Latch selection field | | Select latch (1) or latch (2).<br>Select when the range of latch (1) or latch (2) is set on the <<Device>> tab of PLC parameters. |
| Device | | Display the devices to be assigned automatically. |
| Digit | | Display whether the range of device assign setting is in decimal or hexadecimal. |
| Assignment Selection | | Check the device to be assigned automatically. Multiple devices can be set. |
| Assignment Range | Start | Enter the range of device points to be assigned automatically. |
| | End | |
| Total Points | | Display the total points of each device range for VAR and VAR_RETAIN. |
| PLC Parameter Device Setting Range | | Display the device point range set on the <<Device>> tab of PLC parameters.<br>When the latch range is set, display the device point range with the latch range.<br>(Ex) When D: 0 to 12287, latch D: 5000 to 6000 are set on the <<Device>> tab of PLC parameters, display range of D: 0 to 12287, range of latch D: 5000 to 6000. |

■ FXCPU

## Screen display

Select [Tool] ⇒ [Device/Label Automatic-Assign Setting].




## Operating procedure

- Select the device type, and set the start and end addresses to be assigned automatically.

## 5.7.1 Precautions on automatically assigned devices

● Precautions when changing automatically assigned devices

All programs need to be compiled when the range of automatically assigned device is changed.
Compiling all programs changes the device assignment to labels. Therefore, device values set before the program change remain on the device-assigned labels.
For QCPU (Q mode)/LCPU, reset the programmable controller CPU, clear all device memories including latches, clear all file registers, then switch the programmable controller CPU to RUN for a precautionary measure.
(☞ GX Works2 Version 1 Operating Manual (Common))
For the precautions on compiling all programs, refer to Section 10.3.3.

● Assigning device with Device/Label Automatic-Assign Setting

Assign the devices to labels with the Device/Label Automatic-Assign Setting during compilation.
For details, refer to Section 10.3.
The assigned devices can be checked with the cross reference function.
(☞ GX Works2 Version 1 Operating Manual (Common))
Devices within the range set on the Device/Label Automatic-Assign Setting screen cannot be used in a program.

● Precautions when the multiple types of devices are assigned automatically (QCPU (Q mode)/LCPU)

Refer to Precautions on compilation. (☞ Section 10.3.3 )

● Device types and Setting ranges

The types of automatically assigned devices differ by the type of CPU.
The setting ranges depend on the number of device points set in PLC parameter.
For details of PLC parameter, refer to the following manual.
☞ GX Works2 Version 1 Operating Manual (Common)

● Precautions when displaying the Device/Label Automatic-Assign Setting screen

When displaying the Device/Label Automatic-Assign Setting screen, an error message may be displayed.
In this case, terminate GX Works2, copy "vsflex8n.ocx" stored in the folder of GX Works2 installation destination to "C:\WINDOWS\system32" (for Windows XP), and restart GX Works2.

# 5.8 Writing/Reading Data to/from CSV Files

Q CPU L CPU FX

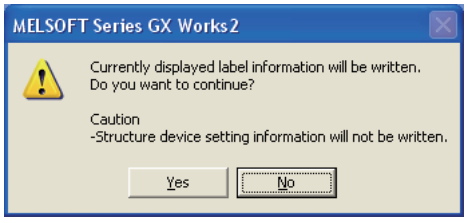
This section explains how to write the label setting data to the CSV file and how to read the label setting data from the CSV file.

## ■ Writing label setting data

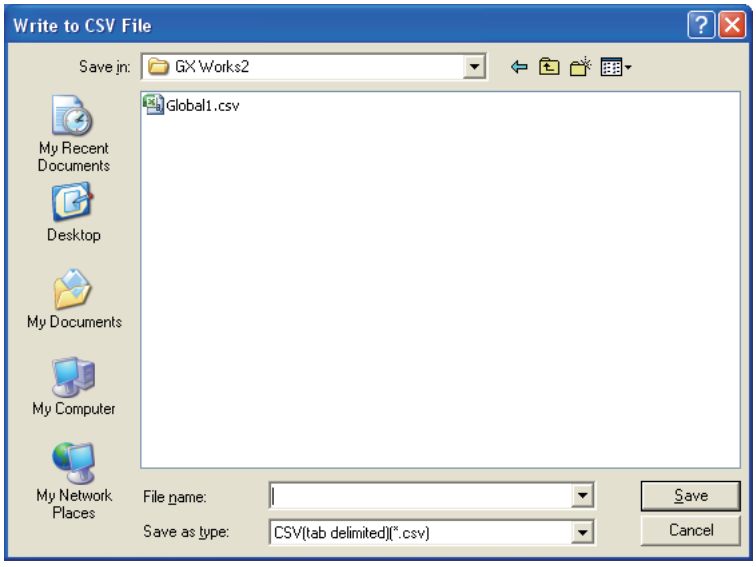
Write label setting data to CSV files.

### Operating procedure

1. **Select [Edit] ⇒ [Write to CSV File] ( ).**
   The following message is displayed.




2. **Click the Yes button.**
   The Write to CSV File screen is displayed.




3. **Enter the file name to be saved and click the Save button.**
   The label setting data is saved in the save destination.

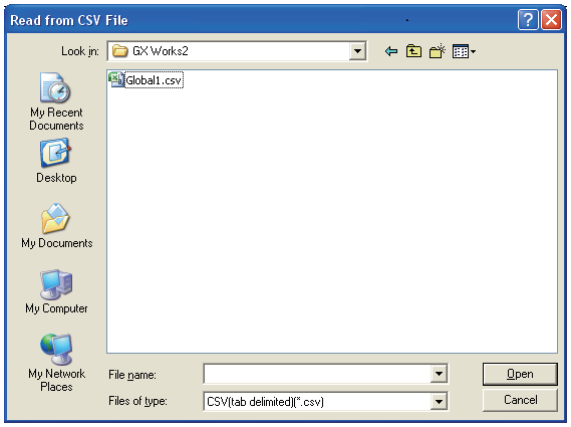
## ■ Reading label setting data

Read label setting data from CSV files.

### Operating procedure

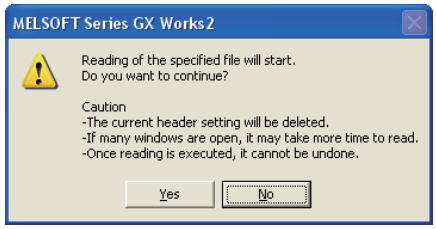
1. **Select [Edit] ⇒ [Read from CSV File] ( ).**

   The Read from CSV File screen is displayed.




2. **Select the file name to be read and click the Open button.**

   The following message is displayed.




3. **Click the Yes button.**

   The label setting data is read to the project.

## ■ CSV file format

The title name of label setting editor links with the title name of the CSV file.

- Data of column which coincides in the title name of label setting editor in the CSV file is read to label setting editor.
- Data of column which does not coincide in the title name of label setting editor cannot be read to the CSV file.
- Columns order of the CSV file can be read even if it does not coincide in the columns order of label setting editor.

<Label setting editor>

Title name

| | Class | Label Name | Data Type | | Constant | Device | Comment | Remark |
|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |

<CSV file>

Title name

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | Project1 | | | | | | |
| 2 | Class | Label Name | Data Type | Constant | Device | Comment | Remark |
| 3 | VAR_GLOBAL | G_LABEL00001 | BOOL | | X1 | Comment00001 | Remark00001 |
| 4 | VAR_GLOBAL | G_LABEL00002 | BOOL | | X2 | Comment00002 | Remark00002 |
| 5 | VAR_GLOBAL | G_LABEL00003 | BOOL | | X3 | Comment00003 | Remark00003 |
| 6 | VAR_GLOBAL_CONSTANT | G_LABEL00004 | BOOL | FALSE | | Comment00004 | Remark00004 |
| 7 | VAR_GLOBAL | G_LABEL00005 | BOOL | | X4 | Comment00005 | Remark00005 |

### Restrictions

● **When multi-byte characters are used in the label name**
Do not use multi-byte characters for a label name when using a CSV file created in Japanese version of GX Works2 in other language version of GX Works2.
For GX Works2 with the language version other than Japanese, this function supports multi-byte characters, however, the compilation function does not support multi-byte characters. Therefore, the program cannot be compiled properly when multi-byte characters are used in a label name.

# MEMO

# 6 EDITING LADDER PROGRAMS

This chapter explains the functions of the ladder editor for editing ladder programs.


6.1 Creating Ladders . . . . . 6-2
6.2 Entering Instructions . . . . . 6-6
6.3 Using Function Blocks . . . . . 6-18
6.4 Using Inline Structured Text . . . . . 6-26
6.5 Moving Cursor to Start of Ladder Block . . . . . 6-31
6.6 Drawing Lines . . . . . 6-32
6.7 Deleting Contacts, Coils, and Application Instructions . . . . 6-35
6.8 Deleting Lines . . . . . 6-38
6.9 Inserting and Deleting Rows and Columns . . . . . 6-41
6.10 Batch Inserting and Deleting NOP Instructions . . . . . 6-45
6.11 Cutting, Copying, and Pasting Ladders . . . . . 6-47
6.12 Canceling Previous Operation . . . . . 6-53
6.13 Restoring Ladders to the Status of After Conversion . . . . 6-54
6.14 Precautions on Editing Ladders . . . . . 6-55
6.15 Changing T/C Setting Values . . . . . 6-62
6.16 Setting Program Linkage Order (FXCPU) . . . . . 6-64

# 6.1 Creating Ladders

Q CPU L CPU FX

This section explains how to create ladders and related functions.

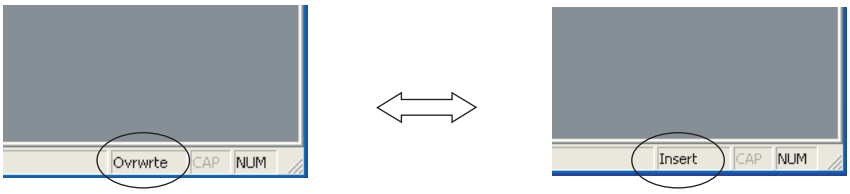
## 6.1.1 Switching between overwrite mode and insert mode

Switch between 'Overwrite mode' and 'Insert mode'. Select the appropriate mode to create programs. The operation procedures in this chapter are explained under the 'Overwrite mode' as the basic setting.

### Operating procedure

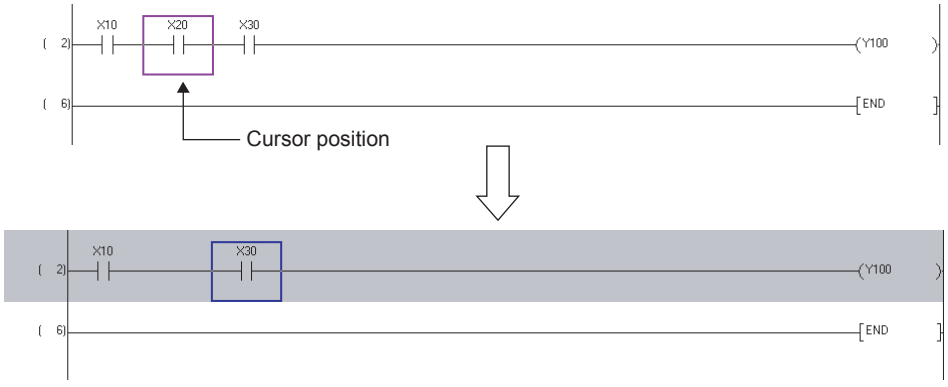
- Press the Insert key.

  The mode switches alternately between 'Overwrite' and 'Insert' each time the key is pressed. The color of the cursor on the editing screen changes according to the active mode.



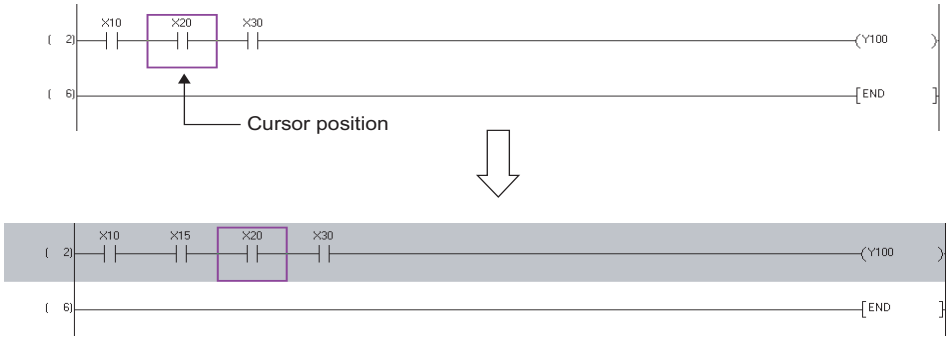

● In the 'Overwrite mode', contacts, coils, or application instructions newly input at the cursor position overwrite the existing ones.

Example) Changing X20 to a horizontal line in the 'Overwrite mode'.




● In the 'Insert mode', contacts, coils, or application instructions newly input at the cursor position are inserted in front of the cursor.

Example) Inserting X15 in front of X20 in the 'Insert mode'.

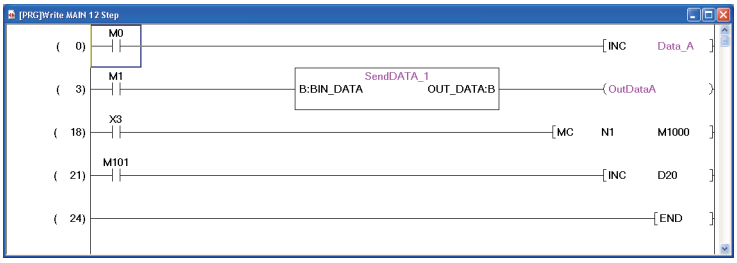


## 6.1.2 Switching between write mode and read mode

Switch between write mode and read mode or monitor (write mode) and monitor mode.
Switch the mode to avoid editing programs directly.

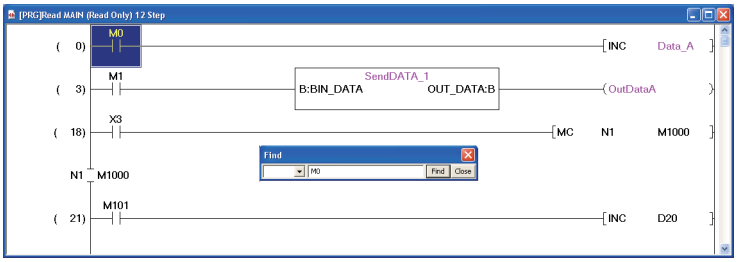
● Write mode/monitor (write mode)

Select when editing the ladders.




● Read mode/monitor mode

Select when operating other than editing the ladders.
Enter a device directly on the program editor to display the Find screen, and search for a device.
The color of the cursor turns to dark blue as shown below in the read mode/monitor mode.
"Read only" is displayed on the screen title.




### ■ Switching between read mode and write mode

Switch between 'read mode' and 'write mode' on the active program editor.

#### Operating procedure

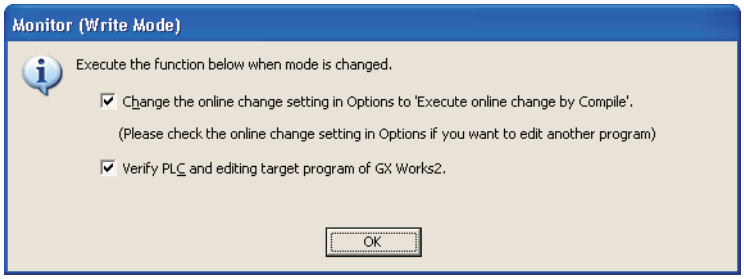
- Select [Edit] ⇒ [Ladder Edit Mode] ⇒ [Read Mode] ( )/[Write Mode] ( ).
  The mode is switched between 'Read mode' and 'Write mode'.

## ■ Switching between monitor mode and monitor (write mode)

Switch between 'monitor mode' and 'monitor (write mode)' on the active program editor during monitoring. For details of monitoring, refer to Chapter 12.

1. **Select [Online] ⇒ [Monitor] ⇒ [Monitor Mode] ( )/[Monitor (Write Mode)] ( ).**

   When switched to 'monitor (write mode)', the message shown below is displayed.
   Uncheck the items if the function displayed on a message is not executed when switching the mode.

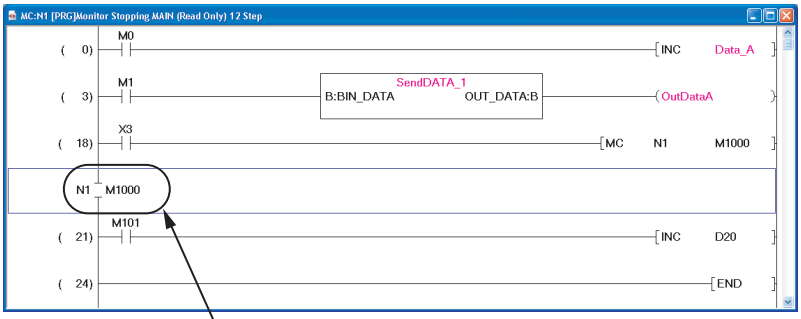



2. **Click the OK button.**

   The mode is switched between 'Monitor mode' and 'Monitor (write mode)'.

## Point

- **Switching between write mode and read mode or monitor (write mode) and monitor mode**
  When the "Use the Switching Ladder Edit Mode (Read, Write, Monitor, Monitor (Write))" item is unchecked under [Tool] ⇒ [Options] ⇒ "Program Editor" ⇒ "Ladder" ⇒ "Ladder Diagram", the program can be edited directly with the same operation as that in the 'write mode' for ladder editing and the 'monitor (write mode)' for monitoring.
- **Precautions on 'read mode'/'monitor mode'**
  The programs cannot be edited directly in the 'read mode'/'monitor mode'. However, executing the following operation may change the programs.
  • When the source FB name is changed or the FB is deleted
  • When I/O labels of the source FB are changed and compiled
  • When the devices or labels are replaced with the replacement function by specifying the whole project
  • When TC setting change is executed
  Use the security function to prevent editing the programs.
  (☞ GX Works2 Version 1 Operating Manual (Common))
- **Displaying in 'read mode'/'monitor mode'**
  When the master control instructions are used in the ladder, the nesting numbers are displayed as shown below.
  For details of nesting number of master control, refer to Section 2.2.1.




A nesting number is displayed.

- **Assigning shortcut keys**
  When the "Use the Switching Ladder Edit Mode (Read, Write, Monitor, Monitor (Write))" item is checked under [Tool] ⇒ [Options] ⇒ "Program Editor" ⇒ "Ladder" ⇒ "Ladder Diagram", the functions assigned to the shortcut keys are changed as shown below table.
  If the shortcut keys are assigned to other functions, the settings in the table are given priority, and the assigned shortcut keys are ignored.
  Use the key customize function to set/change the shortcut keys.
  (☞ GX Works2 Version 1 Operating Manual (Common))

| Shortcut key | Without check | With check |
|---|---|---|
| F2 | – | Write mode |
| Shift + F2 | – | Read mode |
| F3 | Start Monitoring | Monitor mode |
| Shift + F3 | Start Watching | Monitor (write mode) |

- **Monitor (write mode) for FXCPU**
  'Monitor (write mode)' is not supported by FXCPU in the following conditions.
  • When using FX0, FX0S, or FX1
  • When using SFC programs
  • When the simulation function is being performed
  The "Verify PLC and editing target program of GX Works2" function is not supported when the mode is changed to 'monitor (Write mode)' in a project with labels. Verify the program with the Verify with PLC function before changing the mode to 'monitor (write mode)'.
  (☞ GX Works2 Version 1 Operating Manual (Common))

# 6.2 Entering Instructions

Q CPU L CPU FX

This section explains how to enter instructions using menus. For other entering methods, refer to the Points of each section.

## 6.2.1 Entering contacts, coils, and application instructions

Enter contacts, coils, and application instructions.
Contacts, coils, and application instructions are entered by using the Enter Symbol screen.

| Item | | Toolbar | Shortcut key |
|---|---|---|---|
| Ladder Symbol | Open Contact | F5 | F5 |
| | Open Branch | sF5 | Shift + F5 |
| | Close Contact | F6 | F6 |
| | Close Branch | sF6 | Shift + F6 |
| | Coil | F7 | F7 |
| | Application Instruction | F8 | F8 |
| | Rising Pulse*1 | sF7 | Shift + F7 |
| | Falling Pulse*1 | sF8 | Shift + F8 |
| | Rising Pulse Branch*1 | aF7 | Alt + F7 |
| | Falling Pulse Branch*1 | aF8 | Alt + F8 |
| | Rising Pulse Close*2 | saF5 | Shift + Alt + F5 |
| | Falling Pulse Close*2 | saF6 | Shift + Alt + F6 |
| | Rising Pulse Close Branch*2 | saF7 | Shift + Alt + F7 |
| | Falling Pulse Close Branch*2 | saF8 | Shift + Alt + F8 |
| | Operation Result Rising Pulse*3 | aF5 | Alt + F5 |
| | Operation Result Falling Pulse*3 | caF5 | Alt + Ctrl + F5 |
| | Invert Operation Results*1 | caF10 | Alt + Ctrl + F10 |

*1: Not supported by FX0, FX0S, FX0N, FX1, FXU, and FX2CCPUs.

*2: Supported by Universal model QCPU/LCPU only.

*3: Not supported by FX0, FX0S, FX0N, FX1, FXU, FX2C, FX1S, FX1N, FX1NC, FX2N, and FX2NCCPUs.

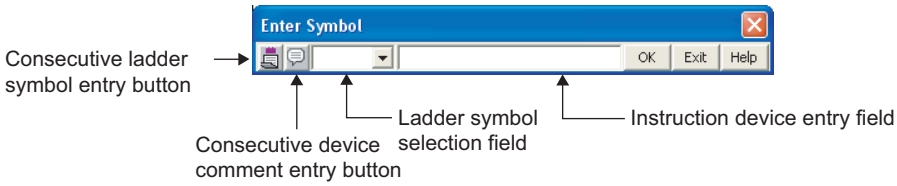
## Operating procedure

1. **Move the cursor to the position where a ladder symbol is entered.**




2. **Select [Edit] ⇒ [Ladder Symbol] ⇒ [(Ladder symbol)].**

The Enter Symbol screen is displayed.




The following table shows the display contents of the screen.

| Name | Description |
|---|---|
| Consecutive ladder symbol entry button | Allow consecutive entry of ladder symbols by changing the setting to consecutive entry status.<br>Consecutive entry ON, Consecutive entry OFF |
| Consecutive device comment entry button | Allow device comment entry after ladder symbol by changing the setting to consecutive entry status.<br>Consecutive entry ON, Consecutive entry OFF |
| Ladder symbol selection field | Allow changing the setting of ladder symbols.<br>Clicking the button displays the list of ladder symbols. |
| Instruction device entry field | Enter an instruction and/or a device. |

3. **Enter an instruction and/or a device.**




4. **Click the OK button.**

The entered ladder symbol is displayed on the editing screen.



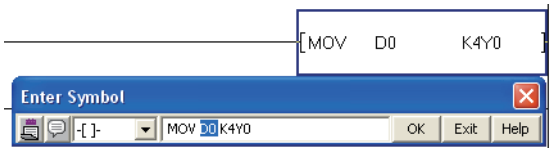
## ■ Simple editing of devices/labels when entering ladder symbols

Edit a device/label on the Enter Symbol screen.

● Open the Enter Symbol screen while the device/label is selected.

**Operation**

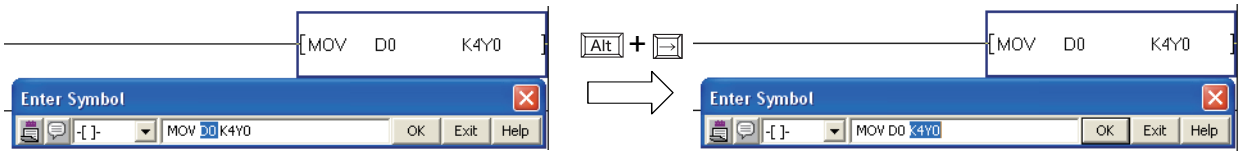
• Press the Ctrl + Alt + Enter keys.




● Move the selection of the device/label.

**Operation**

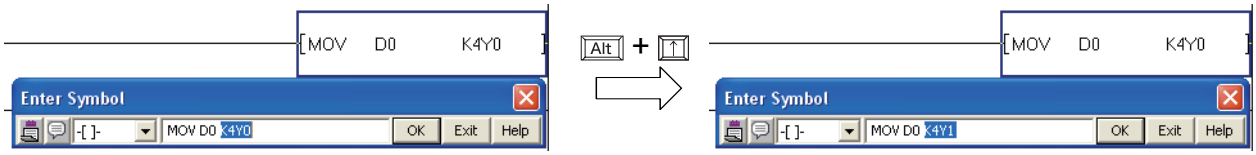
• Press the Alt + ← / → keys.




● Increment/decrement the device/label.

**Operation**

• Press the Alt + ↑ / ↓ keys.




**Point**

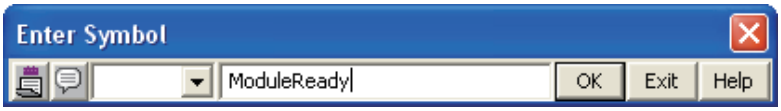
● **Increment and decrement**
- When incrementing a label that does not have a number, 0 is suffixed to it.
- For a device in hexadecimal format, it is incremented/decremented in the hexadecimal format. For X or Y device of FXCPU, it is incremented/decremented in the octal format.

## ■ Registering undefined labels during program creation

When the label that is entered on the Enter Symbol screen is not defined, it can be registered to the label setting editor following the ladder symbol entry.
For registering a new label following the ladder symbol entry, the "Open Undefined Label Registration dialog at ladder entry" item under [Tool] ⇒ [Options] ⇒ "Program Editor" ⇒ "Ladder" ⇒ "Ladder Diagram" needs to be checked.

### Operating procedure

**1. Enter the undefined label on the Enter Symbol screen.**




**2. Click the [OK] button.**

The Undefined Label Registration screen is displayed.




**3. Set the items on the screen.**

| Item | | Description |
|---|---|---|
| Label Name | | Display the label name entered on the Ladder Symbol screen. |
| Label Setting Information | | Select a label setting editor name to be registered from the list displayed by clicking [▼]. |
| | Class | Select a label class from the list displayed by clicking [▼]. |
| | Data Type | Set the data type on the Data Type Selection screen by clicking [...]. (☞ Section 5.5.3) Direct data entry is also possible. |
| | Constant | Display the constant value of the selected data type. When "VAR_GLOBAL_CONSTANT" is selected for "Class" and simple type is selected for "Data Type", the constant value can be set. |
| | Comment*1 | Enter label comments. Switch display/hide label comments to display the label comments on the program editor. (☞ Section 2.2.4) |

*1 : A new line can be inserted in a cell by pressing the [Ctrl] + [Enter] keys.

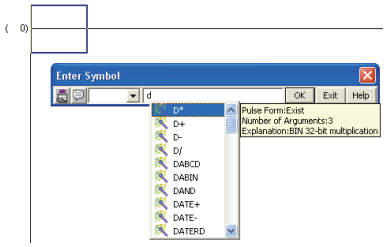
**4. Click the [OK] button.**

The undefined label is registered to the label setting editor.

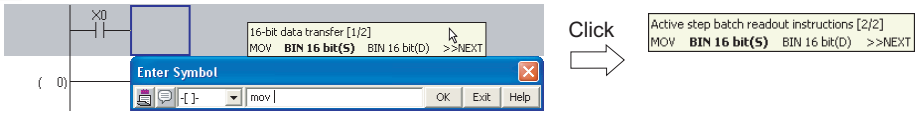
## Point

● **Entering contacts and coils**

- Ladder symbols can also be entered by entering only devices/labels at the specified position. They are entered as coils when they are connected to the right base line, or output devices (Y, DY) are entered. For other circumstances, they are entered as contacts.
- When more than one character of an instruction/label is entered, instructions/labels whose first characters match are displayed. The instruction/label can be entered by selecting with the up/down key. If the entry field is blank, an instruction/label can be selected by pressing the Ctrl + Space keys. Details of instruction/label can be checked with the tool hint.




- When the instruction is entered, the argument that is used for that instruction is displayed in the tool hint. The next instruction option is displayed by clicking the tool hint or by pressing the Ctrl + Shift + Alt + Enter keys.




● **Allowable number of rows for creating ladders**

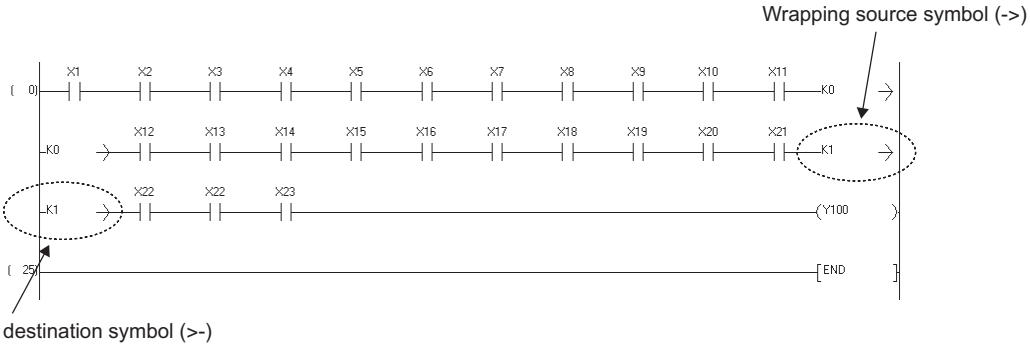
- A maximum number of rows that can be used for one ladder block is 24 lines.
- A maximum number of rows that can be processed in a single ladder conversion operation is 48 rows. Perform ladder conversion appropriately during editing so that the number of ladder rows that has not been converted does not exceed over 48 rows.

● **Scrolling on the ladder editor**

- When ladders that have not been converted exist, the scroll on the ladder editor cannot be performed. Convert ladders, and then scroll with no unconverted ladders exist.

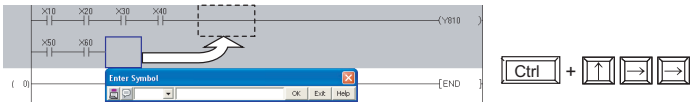
● **Wrapping a row**

A maximum number of contacts that can be created in a single row is 11 contacts + 1 coil or 9 contacts + 1 coil (varies depending on the option setting).
If this limit is exceeded, the wrapping source symbol (->) and the wrapping destination symbol (>-) are automatically created and the ladder is wrapped.
The same numbers (serial numbers) are assigned to the wrapping source symbol (->) and the wrapping destination symbol (>-) that are created in pairs.




● **Changing the cursor position on the editing screen while the Enter Symbol screen is displayed**

Use the Ctrl + ↑ ↓ ← → keys to change the cursor position on the editing screen.




● **Displaying the Instruction Help screen at the occurrence of ladder symbol entry error**

The Instruction Help screen can be displayed automatically by the following setting.
Select [Tool] ⇒ [Options] ⇒ "Program Editor" ⇒ "Ladder" ⇒ "Ladder Diagram", and check the "Display Instruction Help at symbol error occurrence" item.

## 6.2.2 Instruction help

The following explains the help function that supports entering ladder symbols. The help function can be used on the ladder editor only.

### Operating procedure

1. **Click the [Help] button on the Enter Symbol screen.**

   The <<Instruction Selection>> tab on the Instruction Help screen is displayed.

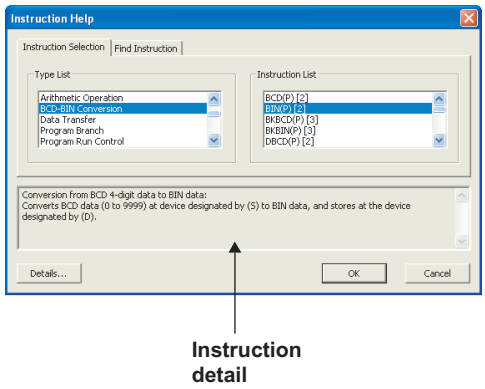



2. **Select the instruction type in the "Type List".**

   The instructions of the selected type are displayed in the "Instruction List".
   (For details of the <<Find Instruction>> tab, refer to the Point.)

3. **Select an instruction from the "Instruction List".**

   The information of the selected instruction is displayed in the instruction detail field.

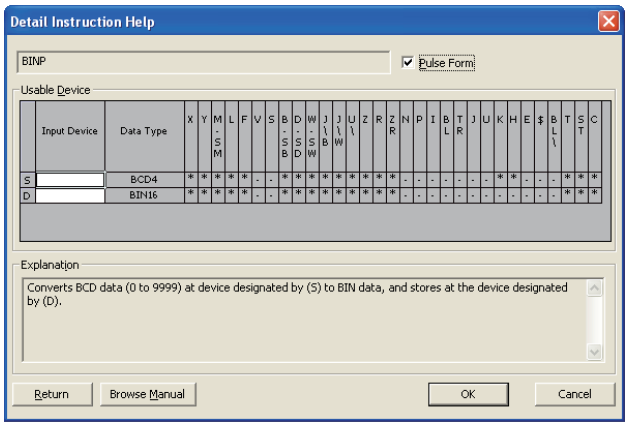



4. **Click the [Details] button.**

   The Detail Instruction Help screen is displayed.

5. **Set the items on the screen.**

| Item | Description |
|---|---|
| Pulse Form | Check this item to convert the instruction into pulse. |
| Input Device | Enter devices.<br>Indication of the symbols:<br>" * ": Applicable<br>" - ": Not applicable |



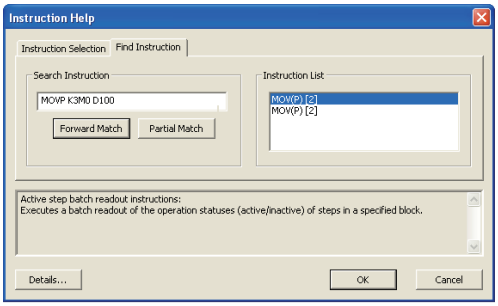

6. **Click the [OK] button on the Detail Instruction Help screen.**

   The instruction is entered at the cursor position.

**Point**

- **Instruction help function**
  The Instruction help function has the <<Instruction Selection>> and <<Find Instruction>> tabs.
  The <<Instruction Selection>> tab is displayed when no instruction is entered in the device instruction entry field of the Enter Symbol screen, and the <<Find Instruction>> tab is displayed when an instruction is entered in the instruction device entry field.
- **Instruction retrieval function**
  If the instruction is entered incompletely or the entered instruction is not supported, the <<Find Instruction>> tab is displayed on the Instruction Help screen when the "Display Instruction Help at symbol error occurrence" item is checked in the option setting.
  If the starting characters of the instructions match with the entered characters, the corresponding instructions are displayed.

  Search method can be switched by clicking the Forward Match or Partial Match button.




- **Checking instructions**
  The specified instruction can be checked on the Instruction Help screen displayed by right-clicking and selecting [Open Instruction Help] from the shortcut menu.
- **Details of instruction**

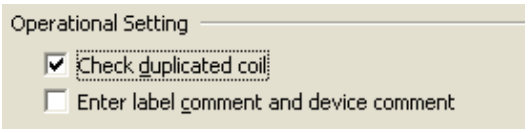
  Details of the instruction can be displayed by clicking the Browse Manual button on the Detail Instruction Help screen. (☞ GX Works2 Version 1 Operating Manual (Common))

## 6.2.3 Selecting the duplicated coil check function

Check duplicated coils in the same program when entering a coil to a ladder-converted program.
The duplicated-coil check function can be set by setting the option.

### Screen display

Select [Tool] ⇒ [Options] ⇒ "Program Editor" ⇒ "Ladder/SFC" ⇒ "Device".




### Operating procedure

- Check the "Check duplicated coil" item.

When a coil is entered, duplicated coils are checked.

○: Available ×: Not available -: Not supported

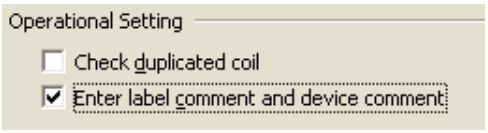
| Device | | Instruction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | DELTA | EGP EGF | FF | MC | OUT | SET | SFT | PLS | PLF |
| QCPU (Q mode)/ LCPU | Y, M, L, B, F, SM, SB | × | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | D, SD, W, SW, R, ZR | × | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | DY | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | T, C | × | × | × | × | ○ | × | × | × | × |
| | V | × | ○ | × | × | × | × | × | × | × |
| | BL | × | × | × | × | × | ○ | × | × | × |
| FXCPU | Y, M | - | - | - | ○ | ○ | ○ | - | ○ | ○ |
| | S | - | - | - | × | ○ | ○ | - | × | × |
| | T, C | - | - | - | × | ○ | × | - | × | × |

## 6.2.4 Entering device comments

Enter a device comment following the entry of a contact, coil, or application instruction.

### Screen display

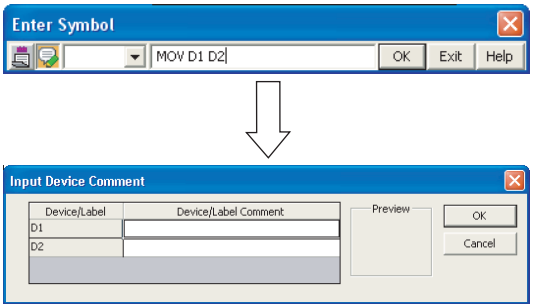
Select [Tool] ⇒ [Options] ⇒ "Program Editor" ⇒ "Ladder/SFC" ⇒ "Device".




### Operating procedure

- Check the "Enter label comment and device comment" item.

The Input Device Comment screen is displayed by clicking the OK button after entering a contact, coil, or application instruction.




For the method for entering device comments, refer to the following manual.
☞ GX Works2 Version 1 Operating Manual (Common)

**Point**

● **Entering device comments**

A device comment can be entered following the ladder symbol entry by clicking on the Enter Symbol screen. (☞ Section 6.2.1)

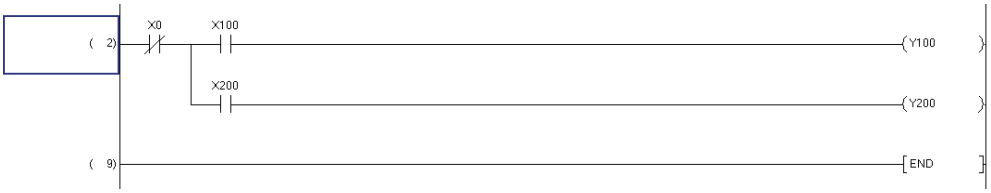
## 6.2.5 Entering pointer numbers and interrupt pointer numbers

Enter a pointer number or an interrupt pointer number.
Pointer numbers or interrupt pointer numbers are entered by using the Enter Symbol screen.

### Operating procedure

1. **Move the cursor to the position where a pointer number or an interrupt pointer number is entered.**

   Enter a pointer number or an interrupt pointer number at the position where a step number is displayed.




2. **Press the Enter key.**

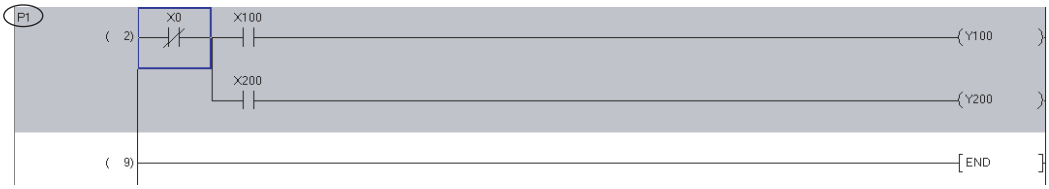
   The Enter Symbol screen is displayed.

3. **Enter a pointer number or an interrupt pointer number.**




4. **Click the OK button.**

   The entered pointer number or interrupt pointer number is displayed on the editing screen.

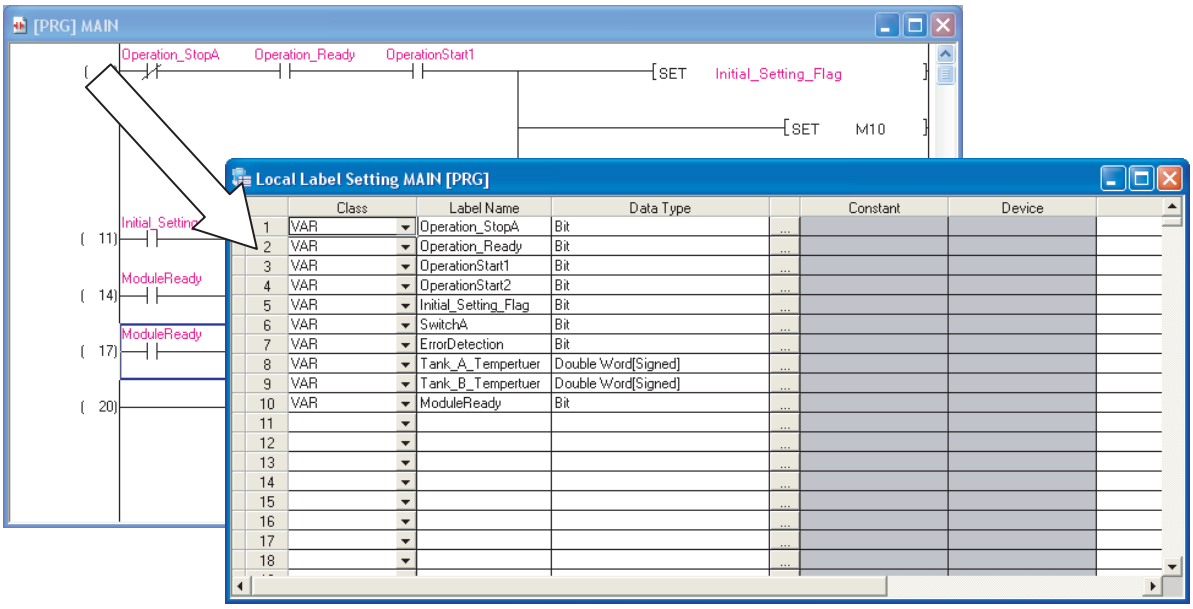


## 6.2.6 Opening label setting screen for program being edited

Open the Local Label Setting screen for the program being edited.

### Operating procedure

- Select [View] ⇒ [Open Header].



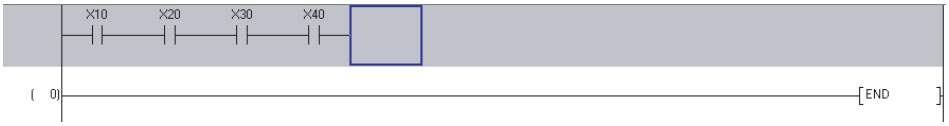

## 6.2.7 Creating wrapping rows

Wrapping symbols are automatically created if wrapping of a row is required when creating a ladder block. However, wrapping symbols can be entered manually as desired. The following explains how to wrap rows by manually entering wrapping symbols.

### Operating procedure

1. **Move the cursor to the position where a wrapping source symbol (->) is entered.**

   When entering a wrapping source symbol (->), move the cursor to the second or subsequent columns.

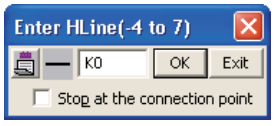



2. **Select [Edit] ⇒ [Ladder Symbol] ⇒ [Horizontal Line] (F9).**

   The Enter HLine screen is displayed.

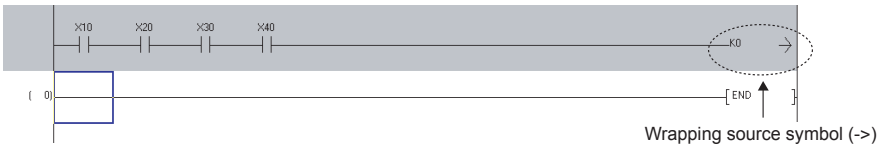



3. **Enter 'K (+ desired number)'.**



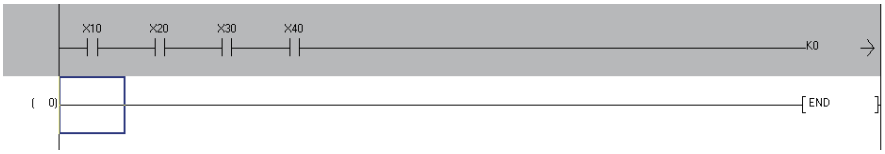
4. **Click the OK button.**

The wrapping source symbol (->) is entered and the row is wrapped.



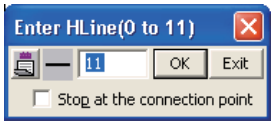

5. **Move the cursor to the position where a wrapping destination symbol (>-) is entered.**

When entering a wrapping destination symbol (>-), move the cursor to the first column.



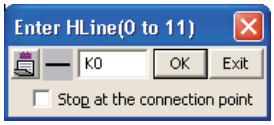

6. **Select [Edit] ⇒ [Ladder Symbol] ⇒ [Horizontal Line] (F9).**

The Enter HLine screen is displayed.



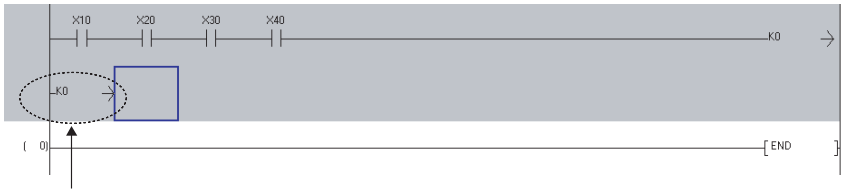

7. **Enter 'K (+ number input in step 3)'.**

A wrapping source symbol (->) and a wrapping destination symbol (>-) are used in pairs for wrapping symbols.
Enter the same number for the paired wrapping symbols.




8. **Click the OK button.**

The wrapping destination symbol (>-) is entered.




**Point**

● **Changing the number of contacts displayed in a ladder program**
The number of contacts (9, 11, 13, 17, or 21) displayed in a single row can be changed.
(☞ Section 2.2.7)

# 6.3 Using Function Blocks

Q CPU L CPU FX

This section explains how to utilize function blocks as components in sequence programs.
To use function blocks, select "Use Label" when creating a new project.

## 6.3.1 Creating function blocks

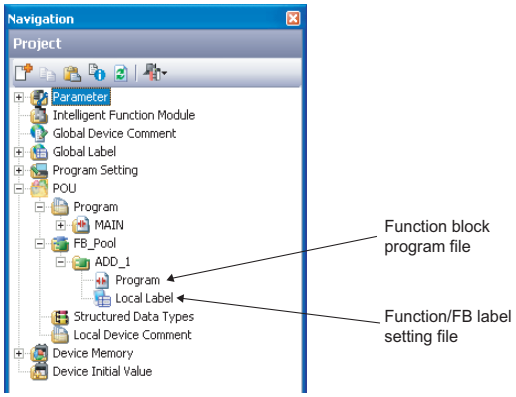
Create a function block.

### Operating procedure

1. **Create a new function block.**

   For the procedure for adding new data in a project, refer to the following manual.
   ☞GX Works2 Version 1 Operating Manual (Common)

   The function block program file and the function block label setting file are added to the project.

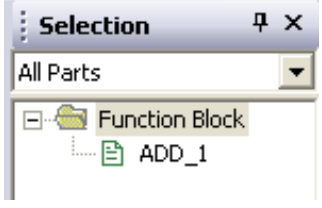



2. **Set the function block label.**

   The created function block can be used as a component.
   (☞ Section 5.4)

3. **Edit the function block ladder.**

   The same procedure as for creating a ladder can be used to edit a function block ladder.
   Created function blocks are displayed in the Function Block Selection window and can be used as function blocks.

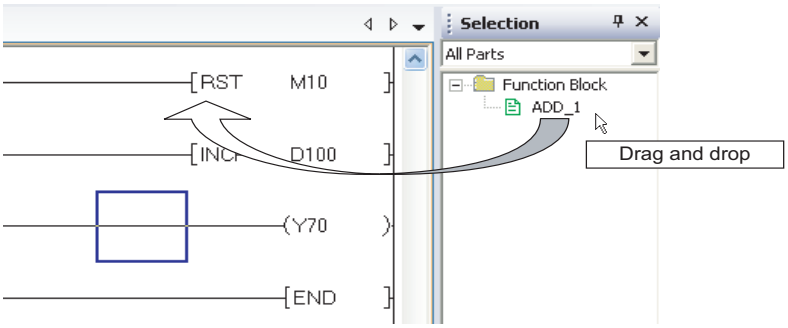


## 6.3.2 Pasting function blocks to sequence programs

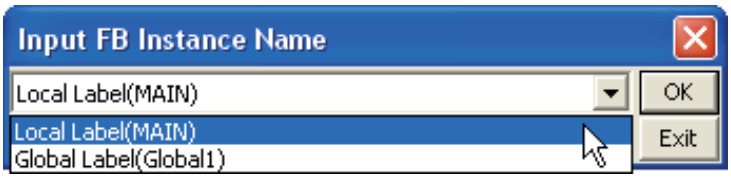
Paste a function block to the sequence program.

### Operating procedure

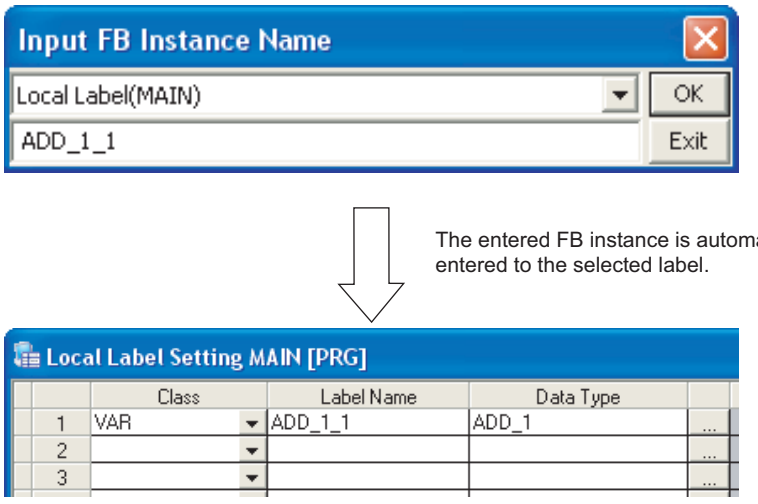
1. **Select a function block from the Function Block Selection window and locate it to the pasting position using the drag and drop operation.**
   The Input FB Instance Name screen is displayed.




2. **Select the registering destination of the function block to be pasted from the local label or global label.**

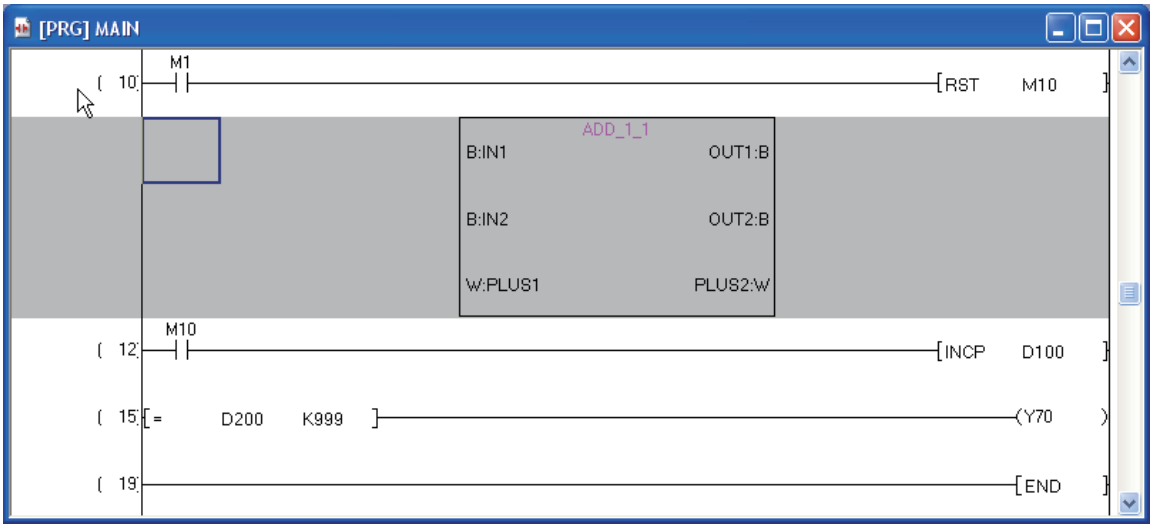



3. **Edit the FB instance name if necessary.**



### 4. Click the OK button.

The function block is pasted on the editing screen.




## Point

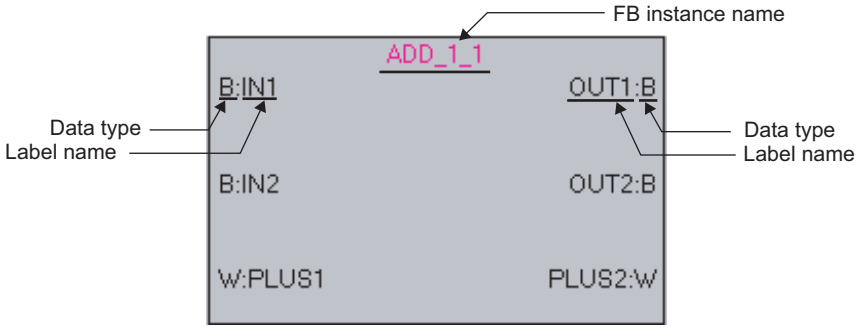
● **Pasting function blocks**

The following methods can also be used to paste function blocks.

- Select a function block from the Project view, and drag and drop it to the pasting position.
- On the editing screen, move the cursor to the pasting position and double-click the function block on the Function Block Selection window.
- On the editing screen, move the cursor to the pasting position and select a function block on the Function Block Selection window, and press the Enter key.

● **Display of pasted function blocks**

In the pasted function block, label names of I/O variables and their corresponding data types are displayed.

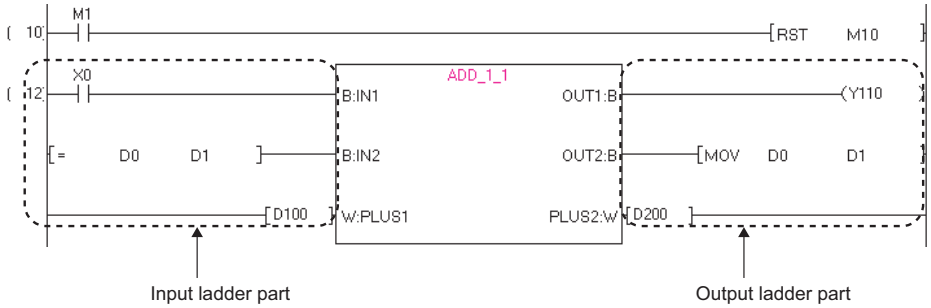



The following are the representation of data types.

- B: Bit
- W: Word (signed)
- D: Double word (signed)
- E: Single-precision real
- L: Double-precision real
- S: String

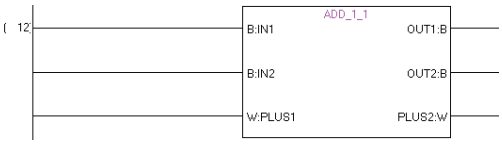
## 6.3.3 Creating input and output ladder parts of function blocks

Create input and output ladder parts of a function block.



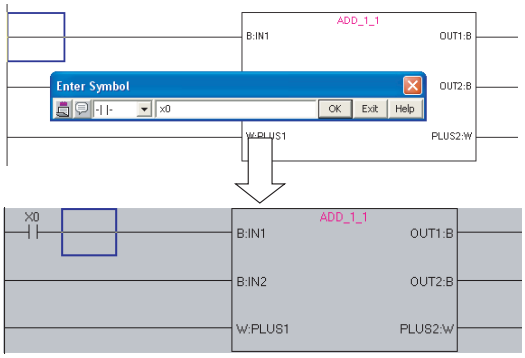

### Operating procedure

1. **Select [Compile] ⇒ [Build].**
   The ladder block is converted.




2. **Enter the ladder symbol of the input ladder part.**
   Enter the ladder symbols in the same manner as creating ladders.
   Create the ladder meeting the data type of input variable.

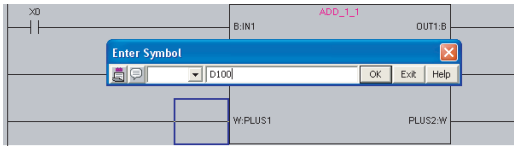
<Bit type>




3. **Enter the output ladder part in the same manner as entering the input ladder part.**

   If the data type of input variable is not a bit type, enter the device directly on the Enter Symbol screen

<Other than bit type>




### Point

● **Number of contacts that can be created at input ladder part and output ladder part**

By setting "Display Connection of Ladder Diagram" (☞ Section 2.2.7), the number of contacts occupied at input ladder part or output ladder part of function block is determined. Instructions that exceed the number of occupied contacts cannot be entered.
When instructions cannot be placed according to the change in the number of displayed contacts, the ladder block is not displayed properly.
The following table shows the number of contacts at input ladder part and output ladder part.

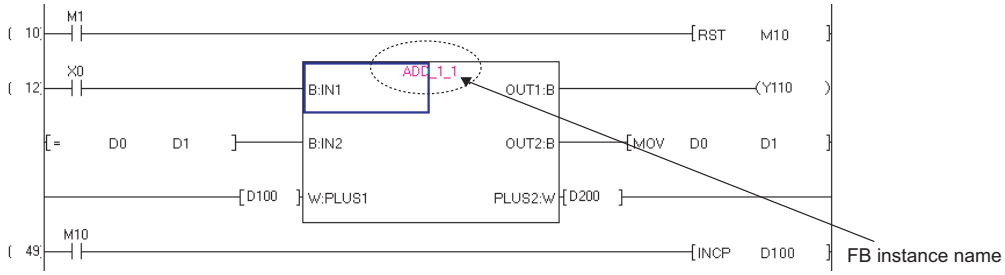
| Number of displayed contacts | Number of contacts at input ladder part | Number of contacts at output ladder part |
|---|---|---|
| 9 contacts | 3 contacts | 2 contacts + 1 coil |
| 11 contacts | 4 contacts | 3 contacts + 1 coil |
| 13 contacts | 5 contacts | 4 contacts + 1 coil |
| 17 contacts | 7 contacts | 6 contacts + 1 coil |
| 21 contacts | 9 contacts | 8 contacts + 1 coil |

## 6.3.4 Changing FB instance names of pasted function blocks

Change the FB instance name of the pasted function block.

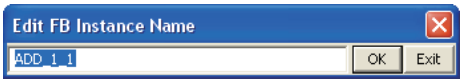
### Operating procedure

**1. Move the cursor to the function block whose FB instance name is to be changed.**




**2. Select [Edit] ⇒ [Edit FB Instance].**

The Edit FB Instance Name screen is displayed.
The current FB instance name is displayed in the entry field.

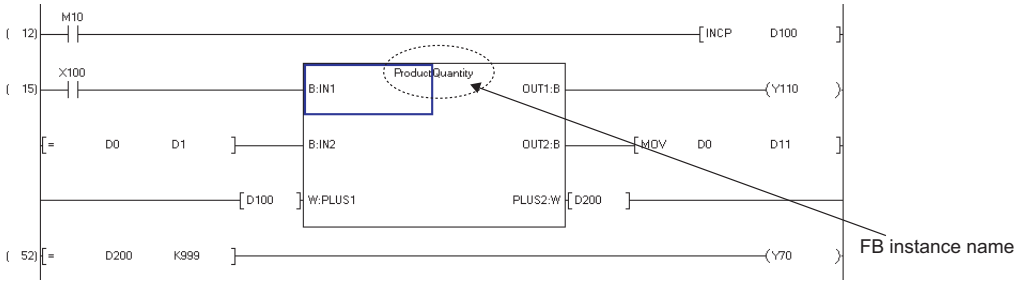



**3. Enter a new FB instance name.**

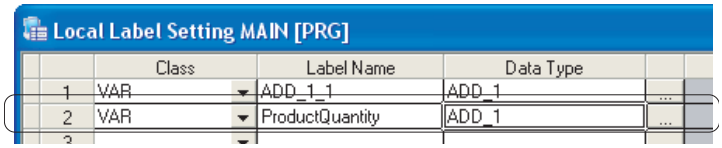



**4. Click the OK button.**

The function block is displayed on the editing screen with the changed FB instance name.




**5. Define an FB instance name to the global label or local label.**




**Point**

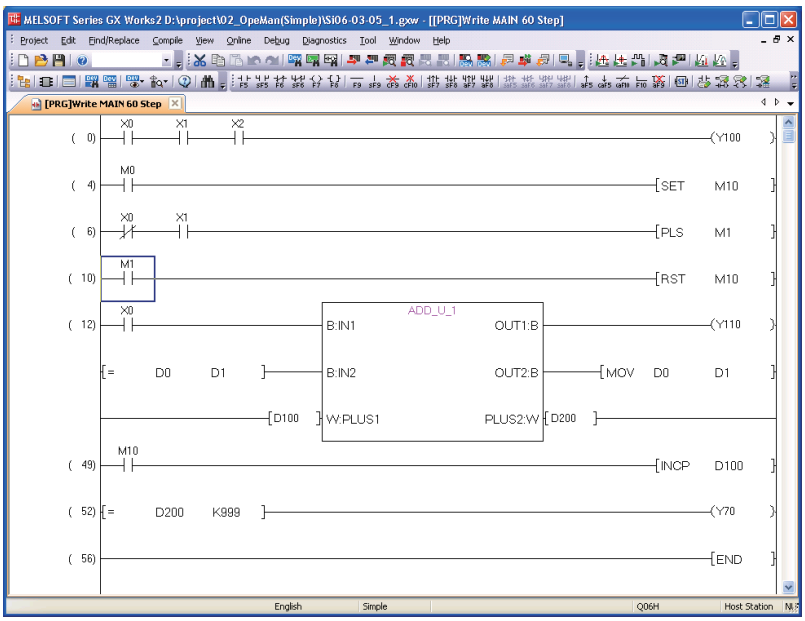
● **Changing FB instance of the same name**
When the same FB instance name is set to the FB instances created from the same function block, changing one of the FB instance name causes to change all FB instances of the same name in the program. However, note that FB instance names are case-sensitive.

## 6.3.5 Displaying function block ladder programs

Open a function block used in the ladder.

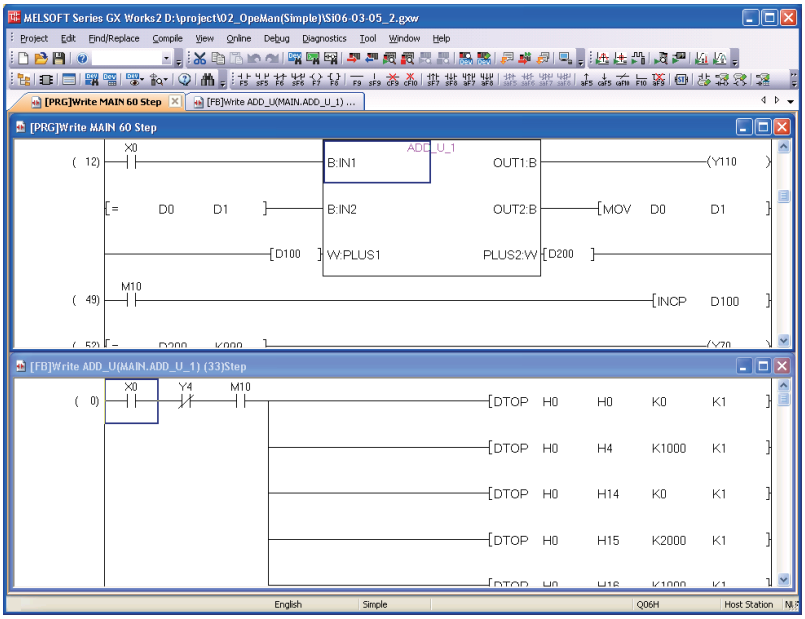
### Operating procedure

1. **Move the cursor to the function block.**




2. **Select [View] ⇒ [Tile FB Horizontally].**

   The function block and its ladder program are displayed horizontally.




**Point**

● **Displaying function block ladder programs**

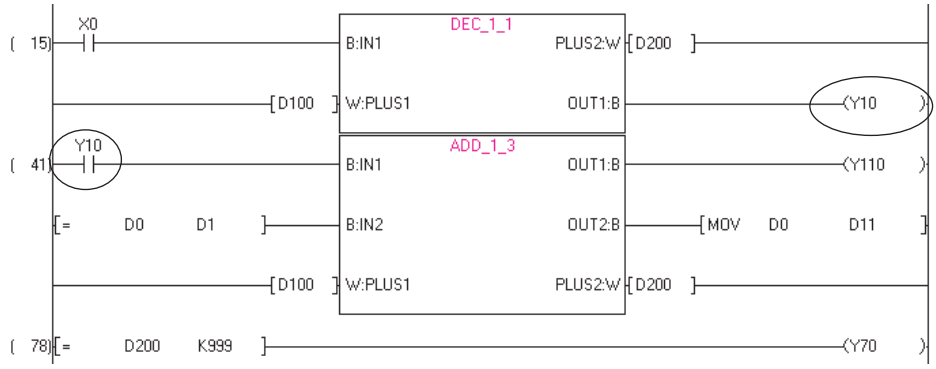
A function block ladder program can also be displayed by moving a cursor to the function block and pressing Shift + Ctrl + Enter keys, or Shift + Ctrl keys + double-click.

## 6.3.6 Precautions on using function blocks

The following explains the precautions on using function blocks.

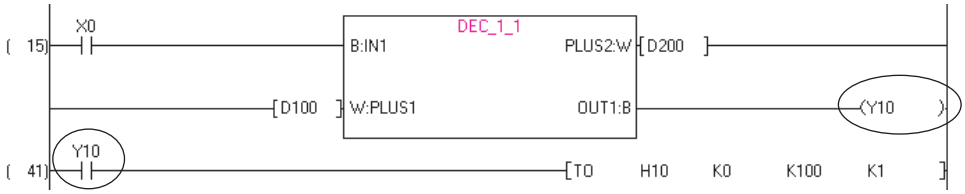
1) One function block can be pasted to a single ladder block.

When connecting function blocks, use a coil to initially receive the function block outputs.
Paste the function block to be connected to another ladder block and connect it with the input.




2) The wrapping rows cannot be created in the input and output ladder parts.

Insert a coil to receive the output and use the contact of the coil as the target instruction condition.




3) The parallel connections cannot be created in the input or output ladder part. An error occurs when the ladders are converted.




4) The data type of the input or output ladder part of the function block, and the data type of the contact/coil/application instruction to be connected must be the same.

Using different data types at the connection causes an error at compilation.
The following are the six device types for function blocks.

- Bit: Data expressed by ON/OFF
- Word (signed): Data expressed in 16 bits
- Double word (signed): Data expressed in 32 bits
- Single-precision real: Floating-point data expressed in 32 bits
- Double-precision real: Floating-point data expressed in 64 bits
- String: Character string data expressed in ASCII code

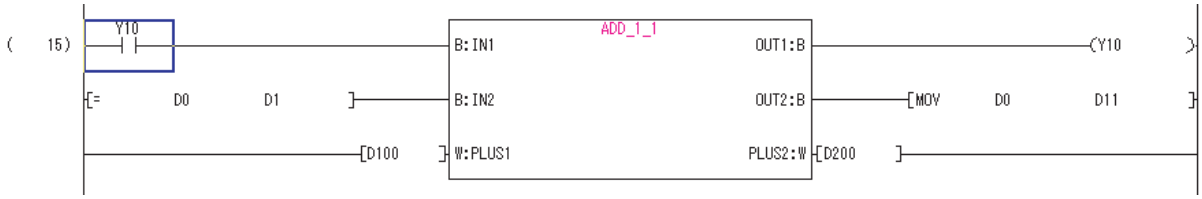
5) If FB instance is not registered on the Label Setting screen when utilizing the function blocks to the ladder, the information of function block name change and function block deletion are not applied to the label setting and ladder.

In this case, delete the function blocks in the ladder manually, and utilize the function blocks again.

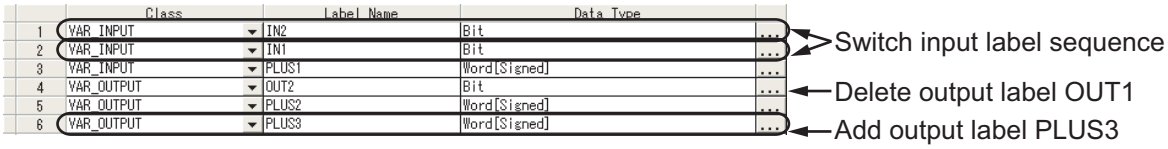
6) When the label setting of function block is changed, compile the program or all programs.

The change of input/output label is applied to the utilization destination ladder during compilation. Note that the change is not applied when the FB instance is not registered in the global label setting or local label setting.

<Example of function block (before changing label settings)>

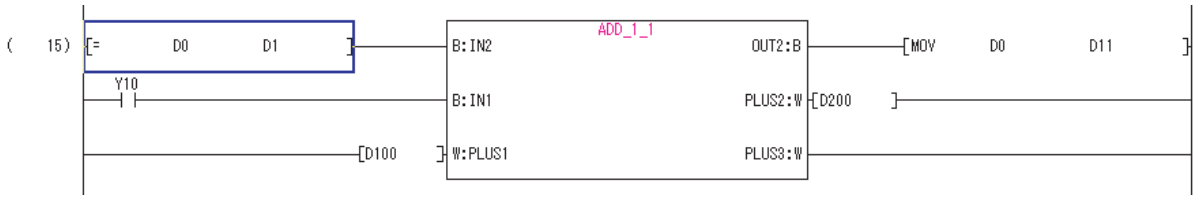



<Label settings of function block>




Execute compilation

<Example of function block (after changing label settings)>




**Point**

● **Checking duplicated coils in the ladder programs**

When the same devices are used in the source ladder program and the target function block, even if "Check duplicated coil" is selected under "Program Editor" ⇒ "Ladder/SFC" ⇒ "Device" in the option setting, the duplicated coils are not detected. Check the duplicated coils in the source ladder program and the target function block by the Cross reference function.

For the projects with labels, the duplicated coils can be checked by unchecking the item in "Program Check" under [Tool] ⇒ [Options] ⇒ "Compile" ⇒ "Basic Setting".

# 6.4 Using Inline Structured Text

Q CPU L CPU FX

This section explains the Inline structured text function.

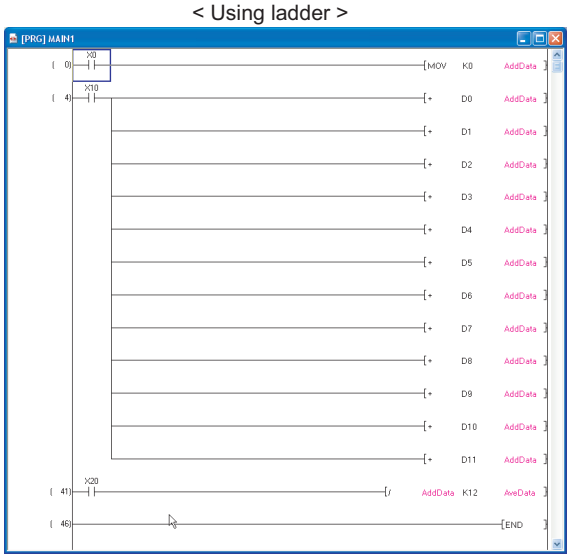
## 6.4.1 Feature of Inline structured text

Inline structured text is a function to edit/monitor a program by creating an inline structured text box that displays a ST program, at the coil instruction area on the ladder editor of the project with labels.
With this function, a numeric value operation or a character string process can be easily created in the ladder program.

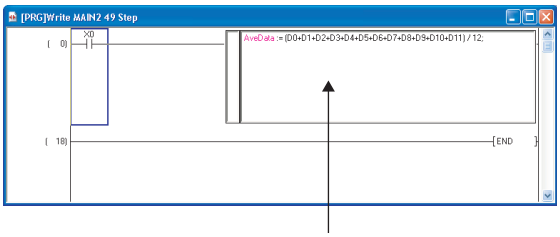
Check the "Enable function block call from ladder to ST and from ST to ladder" item under [Tool] ⇒ [Options] ⇒ "Compile" ⇒ "Basic Setting" to use the Inline structured text function.

For precautions on using the Inline structured text function, refer to Section 6.4.5.

< Using ladder >




< Using Inline structured text >



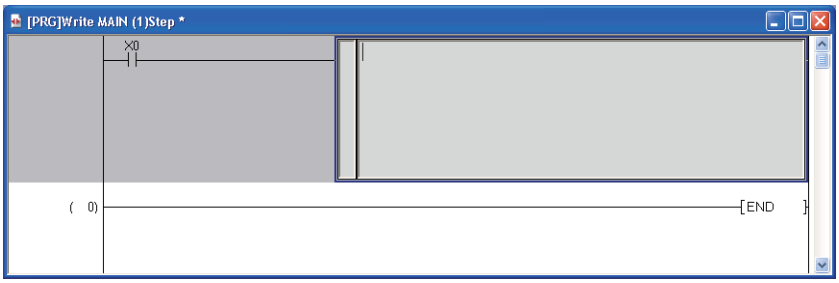

Inline structured text box (STB)

## 6.4.2 Inserting inline structured text box

Insert an inline structured text box on the ladder editor.

### Operating procedure

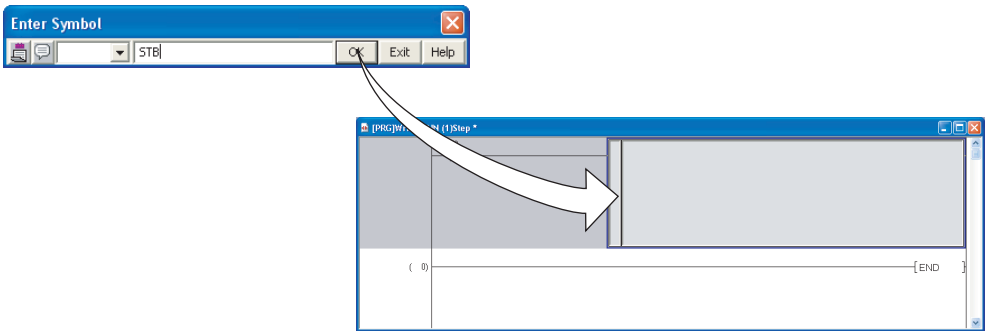
- **Select [Edit] ⇒ [Inline Structured Text] ⇒ [Insert Inline Structured Text Box] ( ).**
  An inline structured text box is inserted.




**Point**

● **Inserting an inline structured text box**

- An inline structured text box can be also inserted by entering "STB" on the Enter Symbol screen.




- An inline structured text box can be also inserted by pressing the Ctrl + B keys.
- A maximum number of inline structured text boxes that can be inserted is 100 per program, and 400 per project.

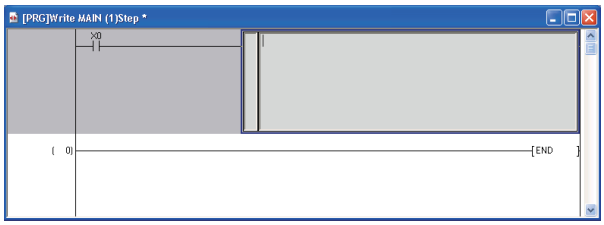
## 6.4.3 Editing inline structured text program

Edit an inline structured text program.

### Operating procedure

1. **Double-click the inline structured text box, or press the Enter key.**

   The inline structured text box becomes editing status.




2. **Edit the inline structured text program.**

   The editing method of the inline structured text program is the same as that of the ST language.
   For editing programs in the ST language, refer to the following manuals.
   ☞ GX Works2 Version 1 Operating Manual (Structured Project)
   ☞ MELSEC-Q/L/F Structured Programming Manual (Fundamentals)

3. **Click the area other than the inline structured text box, or press the Esc key.**

   The editing of the inline structured text program ends.

### Point

- **Editing inline structured text programs**

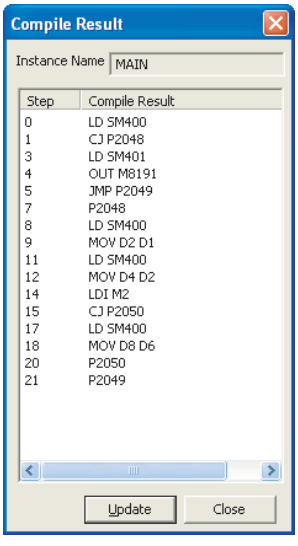
  The editing status can be switched by pressing the F2 key.

- **Displaying instructions/labels in inline structured text**

  When displaying instructions/labels in the inline structured text, the following options must be set.
  Select [Tool] ⇒ [Options] ⇒ "Program Editor" ⇒ "ST" ⇒ "Instruction/label name prediction".
  For details of displaying instructions/labels, refer to Section 6.2.1

- **Displaying inline structured text program in a list form**

  The compiled inline structured text program can be displayed in a list form. Select an inline structured text box to be displayed, and select [View] ⇒ [Display Compile Result].



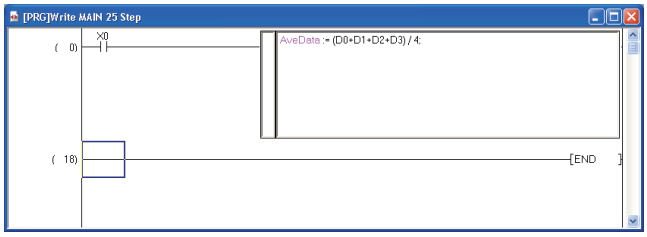

The compilation result is not displayed when the compilation target is an assignment command in which the source data and the target data are the same.
Example in ST language) M0 :=M0;

## 6.4.4 Deleting inline structured text box

Delete an inline structured text box.

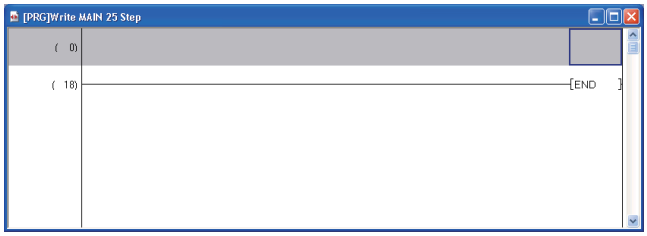
### Operating procedure

1. **Select an inline structured text box to be deleted.**



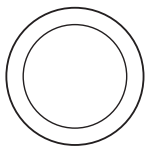

2. **Select [Edit] ⇒ [Delete], or press the Delete key.**

   One ladder block containing the inline structured text box is deleted.

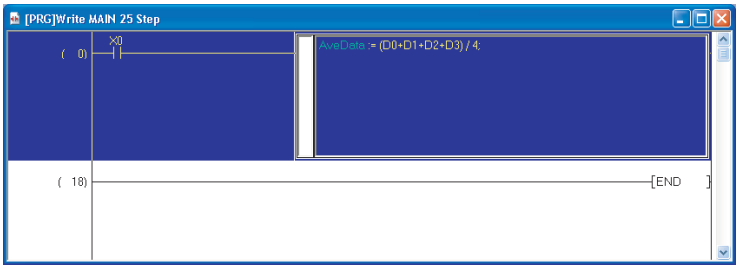



**Point**

● **Range selection when deleting an inline structured text box**
When deleting a ladder block containing a inline structured text box, include the left side of the left power rail. If this area is not selected, a ladder block cannot be deleted.

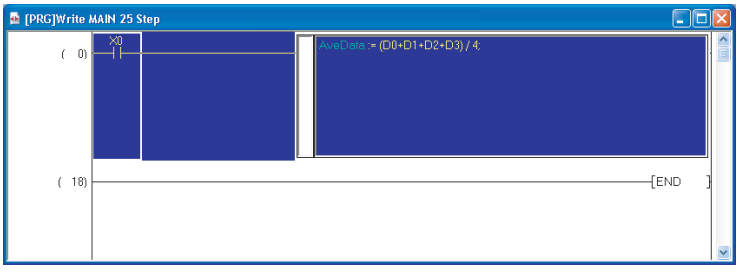


Can be deleted.






Cannot be deleted.



## 6.4.5 Precautions on using Inline structured text function

The following explains the precautions on using the Inline structured text function.

1) Precautions on creating ladder programs
- One inline structured text box can be created for one ladder block.
- An FB and an inline structured text box cannot be used both in a ladder block.
- When the creation of an inline structured text box is attempted at the contact instruction area, an inline structured text box is created at the coil instruction area.
- A ladder program cannot be edited if the ladder block including an unconverted inline structured text program exists on the ladder editor. Edit a program after converting it.

2) Precautions on editing in inline structured text box
- A maximum number of characters that can be entered is 2048. However, two characters are used as the line feed.
- 23 local labels can be used in an inline structured text box. (Excluding constants)
- The following data type labels cannot be used.
  - Counter
  - Timer
  - Retentive timer
  - Pointer
  - Structure
  - Array
  - Function block
- By setting the option, lower-case device names can be used as labels only for device names which are out of the range set on the <<Device>> tab of PLC parameters.
- Instructions cannot be entered using the Function Block Selection window.
- The editing status cannot be recovered to the previous status by the operation such as selecting [Edit] ⇒ [Undo].
- Word device indirect specification (@D0) cannot be executed.

3) Copying inline structured text box

When copying an inline structured text box, select a ladder block including the left side of the left power rail. Contacts of a ladder block containing an inline structured text box only or an inline structured text box only, cannot be copied.
A ladder block containing an unconverted inline structured text box also cannot be copied. Copy a ladder block after converting the program. (☞ Chapter 10)

4) Re-pasting after deleting inline structured text box*1

When compiling with re-pasting the data which existed in the deleted inline structured text box, the compile result will not be the same program as before deleting the inline structured text box.
The devices to be assigned automatically are changed when a program is compiled.
Therefore, verifying the re-pasted project may cause the verification inconsistency.
*1: Re-paste is to create or paste the same data as deleted inline structured text box.

# 6.5 Moving Cursor to Start of Ladder Block

Q CPU L CPU FX

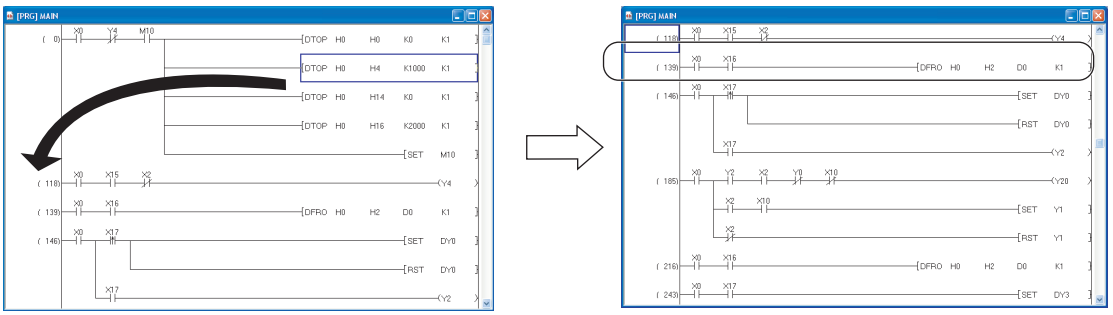
This section explains how to move a cursor from the current position to the start of the next/previous ladder block.

## Operating procedure

- Select [Find/Replace] ⇒ [Jump to Next Ladder Block Start]/[Jump to Previous Ladder Block Start].
  The cursor moves to the start of the ladder block.

  Example) When jumping to the start of the next ladder block

The cursor moves to the start of the next ladder block.



**Point**

● **Moving a cursor**

- The cursor can be also moved to the start of the next/previous ladder block by pressing the Ctrl + Alt + PgDown / PgUp keys.

# 6.6 Drawing Lines

Q CPU L CPU FX

This section explains how to draw lines.

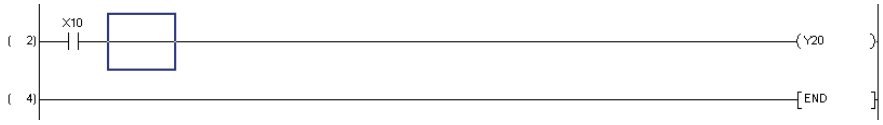
| Item | Toolbar | Shortcut key |
|---|---|---|
| Edit Line | F10 | F10 |
| Vertical Line | sF9 | Shift + F9<br>Ctrl + ↑ / ↓ |
| Horizontal Line | F9 | F9<br>Ctrl + ← / → |
| Enter horizontal line consecutively | - | Ctrl + Shift + ← / → |

## 6.6.1 Drawing lines

Draw vertical and horizontal lines consecutively.

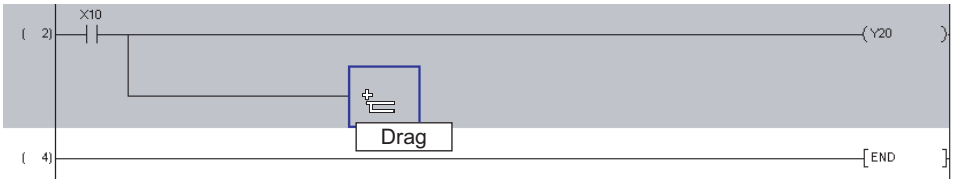
### Operating procedure

1. **Move the cursor to the position where a vertical line is drawn.**
   A line is drawn taking the left edge of the cursor as a base point.




2. **Select [Edit] ⇒ [Edit Line] (F10).**

3. **Drag the cursor in the line drawing direction.**




4. **The line is drawn upon completion of dragging.**

5. **To end the line drawing function, select [Edit] ⇒ [Edit Line] (F10) again.**
   The edit line mode is disabled.

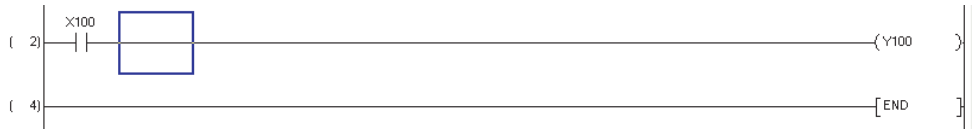
## 6.6.2 Entering vertical or horizontal lines

Enter a vertical or horizontal line.

### Operating procedure

1. **Move the cursor to the position where a vertical or horizontal line is entered.**

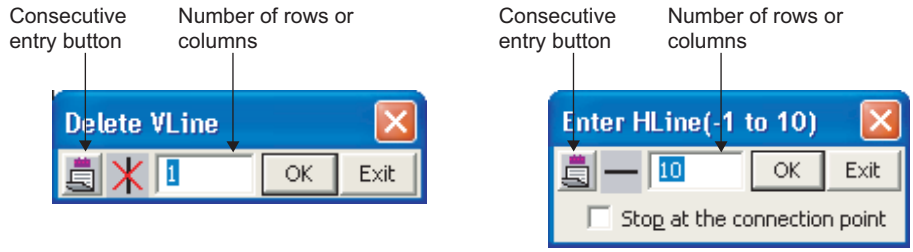
   A vertical line is entered taking the left edge of the cursor as a base point.




2. **Select [Edit] ⇒ [Ladder Symbol] ⇒ [Vertical Line] (SF9).**

   The Enter VLine screen is displayed.

   To enter a horizontal line, select [Edit] ⇒ [Ladder Symbol] ⇒ [Horizontal Line] (F9).




3. **Set the items on the screen.**

| Name | Description |
|---|---|
| Consecutive entry button | Allow consecutive entry of vertical or horizontal lines by changing the status.<br>Consecutive entry ON, Consecutive entry OFF |
| Number of rows or columns | Enter the number of rows or columns to be entered.<br>The applicable number of rows or columns to enter lines toward the down or right direction is displayed when the screen is opened. Change the value as required. |
| Stop at the connection point | Check this to stop data entry on a connecting point when the connecting points such as instructions or vertical lines exist while entering the horizontal lines for the columns entered to "Number of rows or columns".<br>Set when entering the horizontal lines.<br>This item links with the "Stop at the connection points (Instruction/Vertical Line) when enter or delete horizontal line" item under [Tool] ⇒ [Options] ⇒ "Program Editor" ⇒ "Ladder" ⇒ "Ladder Diagram". |

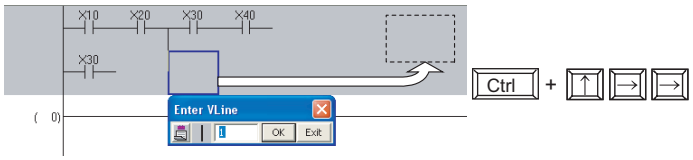
4. **Click the OK button.**

   The entered vertical line or horizontal line is displayed on the editing screen.

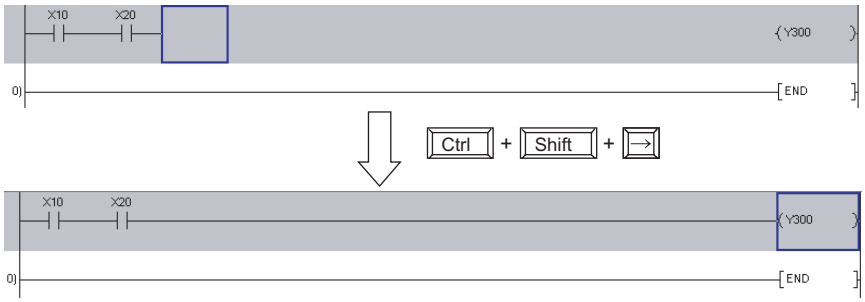


## Point

- **Initial values of "Number of rows or columns"**
  The initial value of the Enter HLine screen can be set to 1 with option settings.
  Check "Set initial value to '1' for Enter HLine/Delete HLine dialog" under [Tool] ⇒ [Options] ⇒ "Program Editor" ⇒ "Ladder" ⇒ "Ladder Diagram".
- **Changing the cursor position on the editing screen while the Enter VLine screen or Enter HLine screen is displayed**
  Use the Ctrl + ↑ ↓ ← → keys to change the cursor position on the editing screen.




- **Entering horizontal lines consecutively**
  Use the Ctrl + Shift + ← / → keys to enter the horizontal lines consecutively from the cursor position.



# 6.7 Deleting Contacts, Coils, and Application Instructions

Q CPU L CPU FX

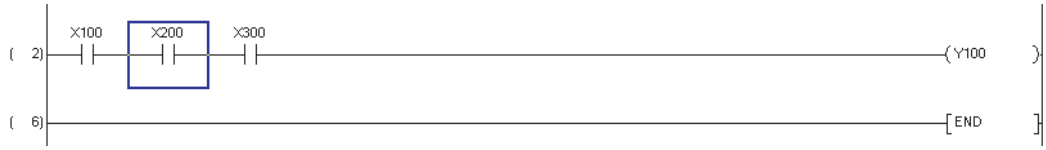
This section explains how to delete contacts, coils, and application instructions.

## 6.7.1 Deleting contacts, coils, and application instructions in unit of instruction

Delete a contact, coil or application instruction in unit of instruction.

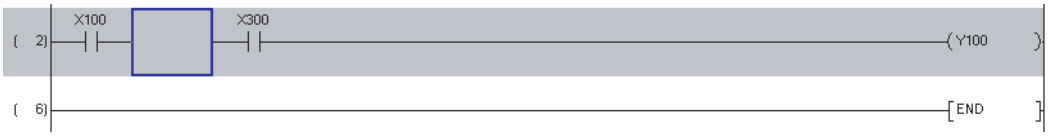
### Operating procedure

1. **Move the cursor to the position where the instruction is deleted.**




2. **Press the Delete key.**

   The instruction is deleted.




**Point**

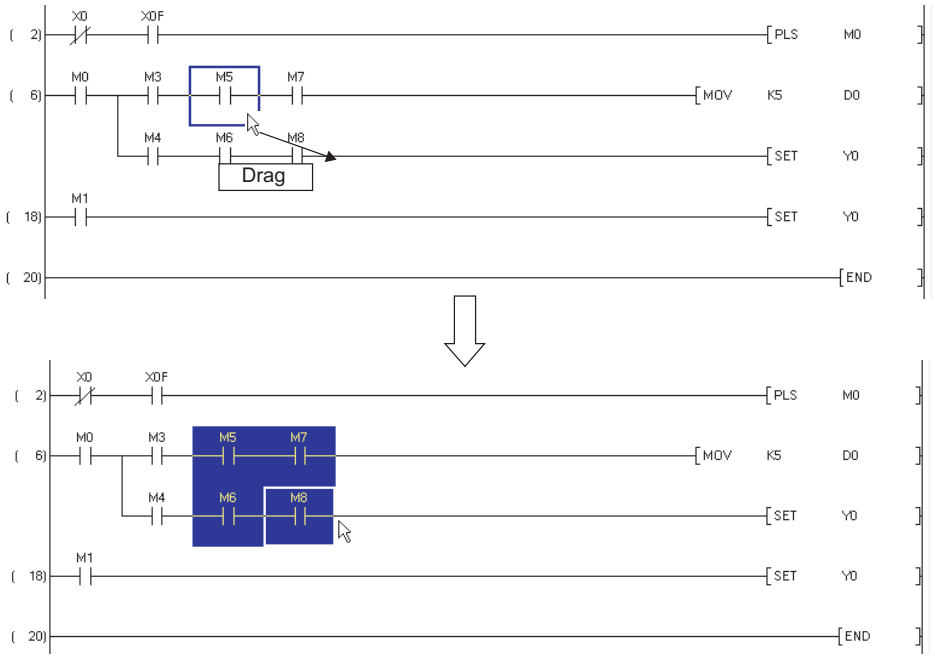
- **Deletion in the 'Insert mode'**
  **If the instruction is deleted in the 'Insert mode', the instructions that follow the deleted instruction are shifted forward.**
  **With wrapping lines, the instructions are shifted when the ladder is converted.**

## 6.7.2 Deleting contacts, coils, and application instructions by setting a range

Delete contacts, coils, and/or application instructions by setting a range.

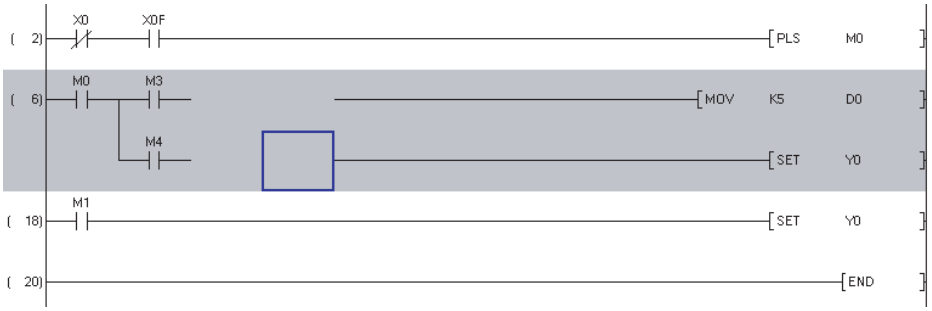
### Operating procedure

**1. Set the range by dragging the cursor from the start position of deletion.**



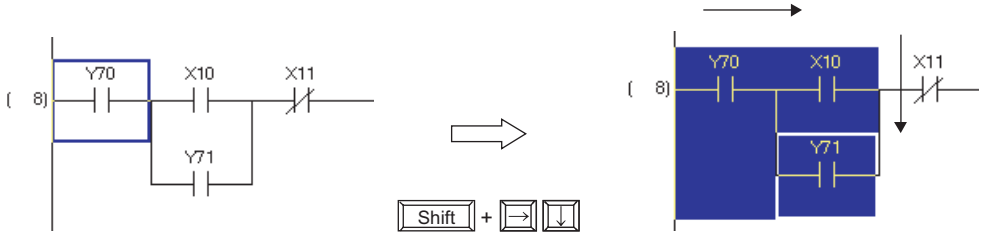

**2. Press the Delete key.**

The instructions in the set range are deleted.




**Point**

● **The range can be set by pressing the Shift + ↑ ↓ ← → keys.**



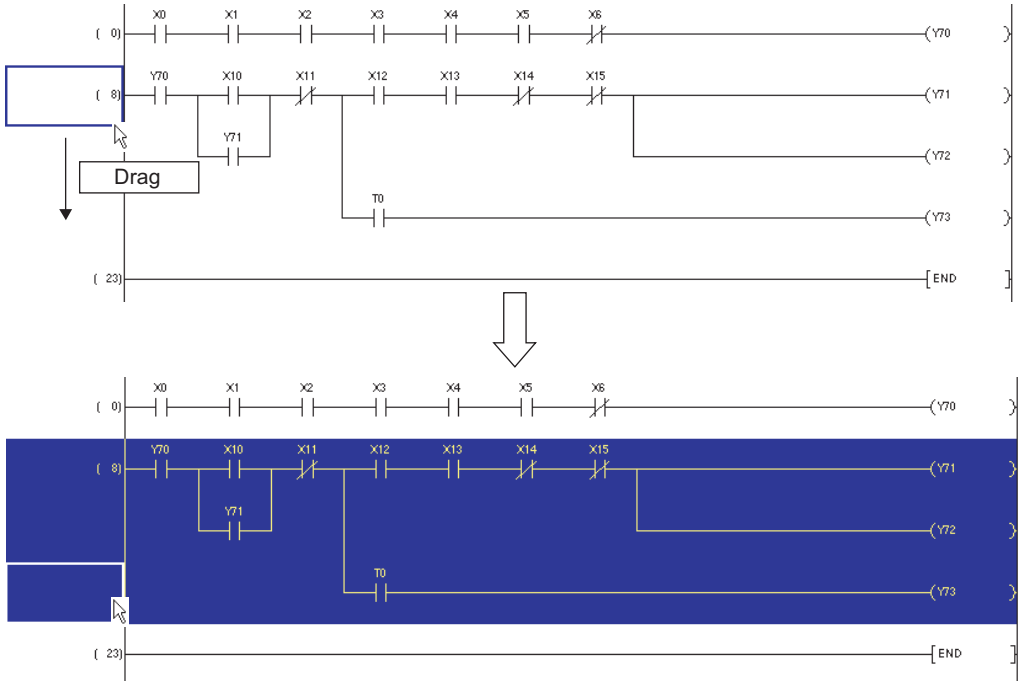
## 6.7.3 Deleting a ladder block

Delete one ladder block at a time.

### Operating procedure

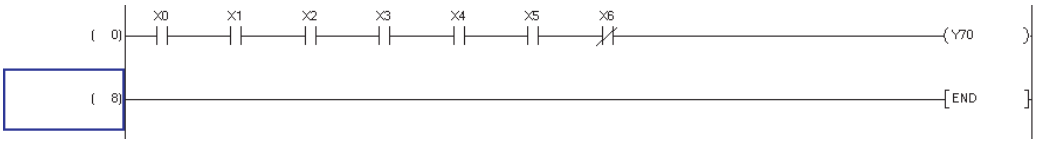
1. **Place the cursor at the start position of deletion and drag it up or down to set the range.**

   Specify the range of a ladder block at the position where step numbers are displayed.




2. **Press the Delete key.**

   The ladder block is deleted.



# 6.8 Deleting Lines

Q CPU L CPU FX

This section explains how to delete lines.

| Item | Toolbar | Shortcut key |
|---|---|---|
| Delete Line | | Alt + F9 |
| Delete Vertical Line | | Ctrl + F10<br>Ctrl + ↑ / ↓ |
| Delete Horizontal Line | | Ctrl + F9<br>Ctrl + ← / → |
| Delete horizontal line consecutively | - | Ctrl + Shift + ← / → |

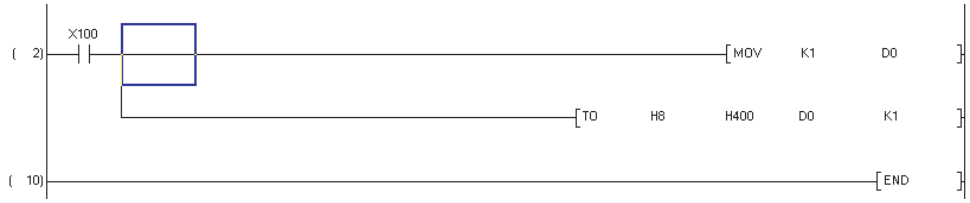
## 6.8.1 Deleting lines

Delete vertical and horizontal lines consecutively.

### Operating procedure

1. **Move the cursor to the position where the lines are deleted.**

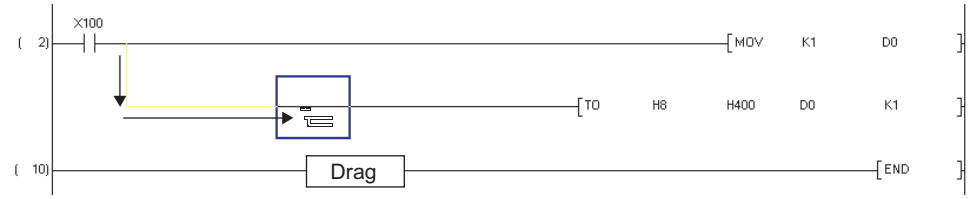
   The vertical line is deleted taking the left edge of the cursor as a base point.




2. **Select [Edit] ⇒ [Delete Line] ( ).**

3. **Drag the cursor in the direction for line deletion.**

   The selected lines are displayed in yellow.




4. **The lines are deleted upon completion of dragging.**

5. **To end the Delete Line function, select [Edit] ⇒ [Delete Line] ( ) again.**

   The line deletion mode is disabled.

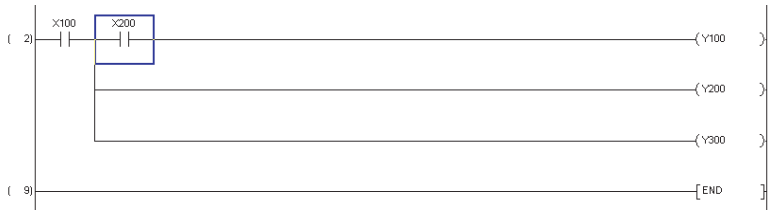
## 6.8.2 Deleting vertical or horizontal lines

Delete a vertical or horizontal line.

### Operating procedure

1. **Move the cursor to the start of the vertical or horizontal line to be deleted.**

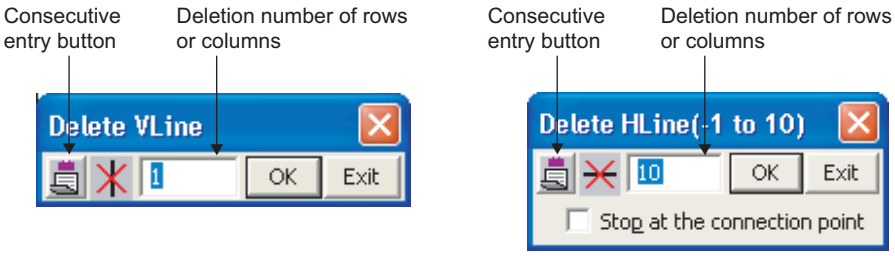
   The vertical line is deleted taking the left edge of the cursor as a base point.




2. **Select [Edit] ⇒ [Ladder Symbol] ⇒ [Delete Vertical Line] ( ).**

   The Delete VLine screen is displayed.

   To delete a horizontal line, select [Edit] ⇒ [Ladder Symbol] ⇒ [Delete Horizontal Line] ( ).

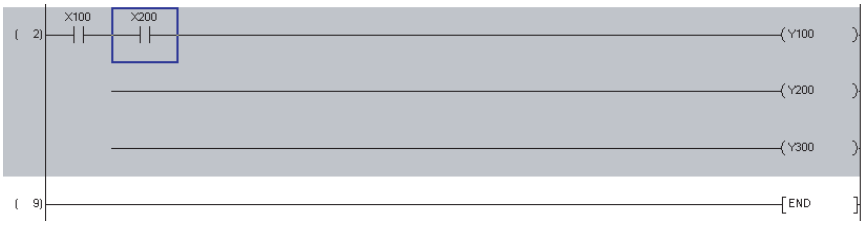



3. **Set the items on the screen.**

| Name | Description |
|---|---|
| Consecutive entry button | Allow consecutive deletion of vertical lines by changing the status.<br>Consecutive entry ON, Consecutive entry OFF |
| Deletion number of rows or columns | Enter the number of rows or columns to be deleted.<br>The applicable number of rows or columns to delete lines toward the down or right direction is displayed when the screen is opened. Change the value as required. |
| Stop at the connection point | Check to stop deletion on a connecting point when the connecting points such as instructions or vertical lines exist while deleting the horizontal lines for the columns entered to "Deletion number of rows or columns".<br>Set when deleting the horizontal lines.<br>This item links with the "Stop at the connection points (Instruction/Vertical Line) when enter or delete horizontal line" item under [Tool] ⇒ [Options] ⇒ "Program Editor" ⇒ "Ladder" ⇒ "Ladder Diagram". |

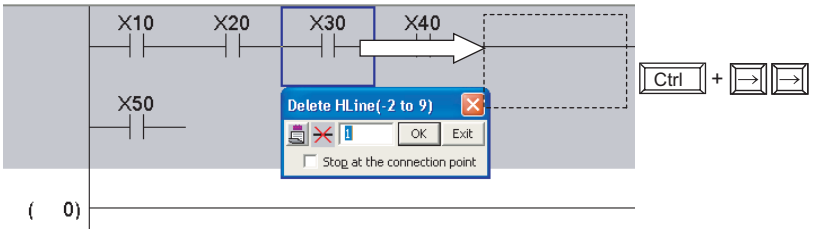
4. **Click the OK button.**

   Vertical lines are deleted.



## Point

- **Initial values of "Deletion number of rows or columns"**
  The initial value of the Delete HLine screen can be set to 1 with option settings.
  Check "Set initial value to '1' for Enter HLine/Delete HLine dialog" under [Tool] ⇒ [Options] ⇒ "Program Editor" ⇒ "Ladder" ⇒ "Ladder Diagram".
- **Changing the cursor position on the editing screen while the Delete VLine screen or Delete HLine screen is displayed**
  Use the Ctrl + ↑ ↓ ← → keys to change the cursor position on the editing screen.



# 6.9 Inserting and Deleting Rows and Columns

Q CPU L CPU FX

This section explains how to insert and delete rows and columns.

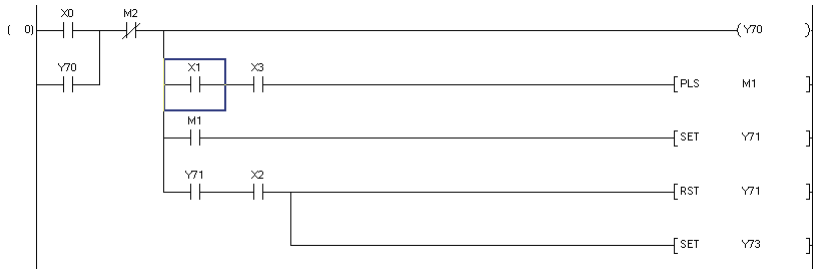
| Item | Shortcut key |
|---|---|
| Insert Row | Shift + Insert |
| Delete Row | Shift + Delete |
| Insert Column | Ctrl + Insert |
| Delete Column | Ctrl + Delete |

## 6.9.1 Inserting rows

Insert rows.

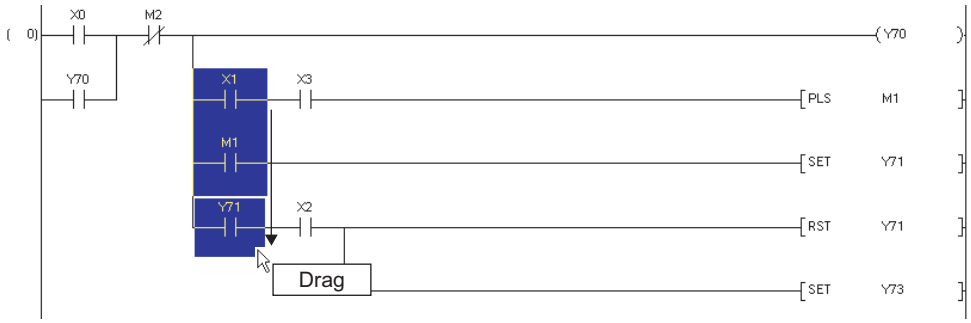
### Operating procedure

1. **Move the cursor to the position where a row is inserted.**



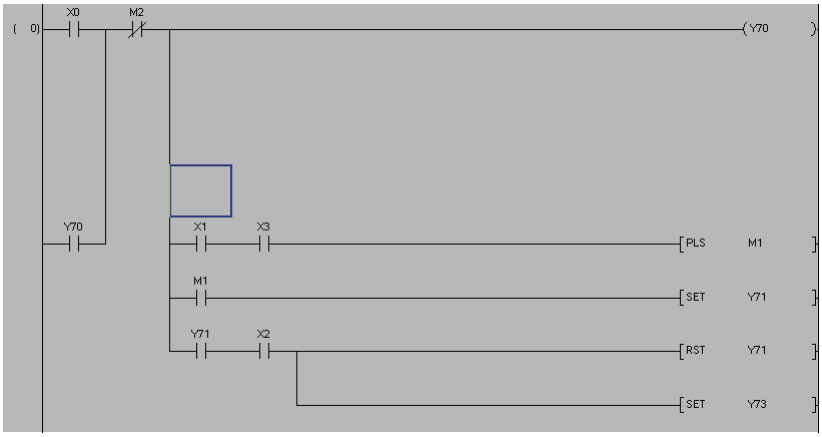

2. **To insert multiple rows, drag the cursor and set the range corresponding to the number of rows to be inserted.**

   The rows in the set range are inserted.
   To insert a single row, it is not necessary to set the range.
   In the screen image below, the range for inserting three rows is set.



3. **Select [Edit] ⇒ [Insert Row].**

A space is inserted above the cursor position.
The screen image below shows insertion of a space for three rows.

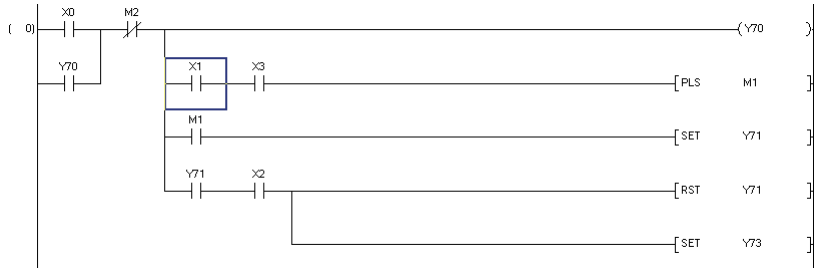



## 6.9.2 Deleting rows

Delete rows.

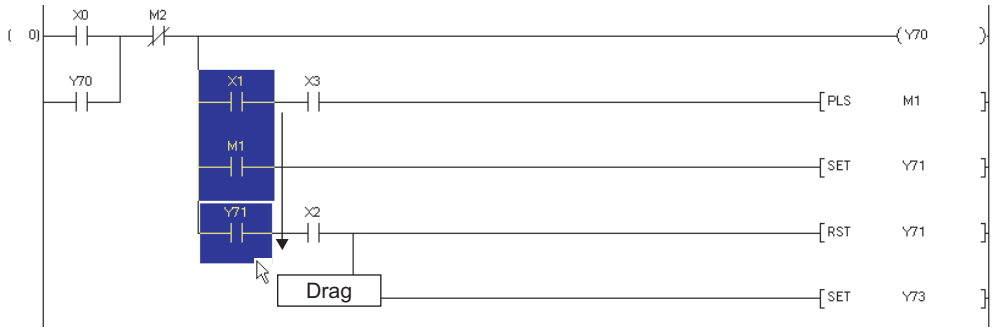
### Operating procedure

1. **Move the cursor to the position where the row is deleted.**




2. **To delete multiple rows, drag the cursor and set the range corresponding to the number of rows to be deleted.**

The rows in the set range are deleted.
To delete a single row, it is not necessary to set the range. The row at the cursor position is deleted.



3. **Select [Edit] ⇒ [Delete Row].**

The rows are deleted.



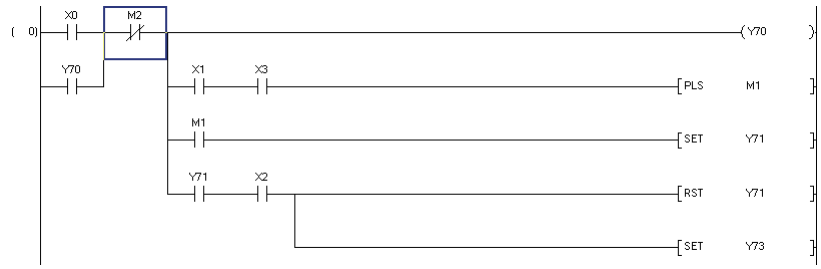

## 6.9.3 Inserting columns

Insert columns. Columns are inserted through the whole rows of ladder block.

### Operating procedure

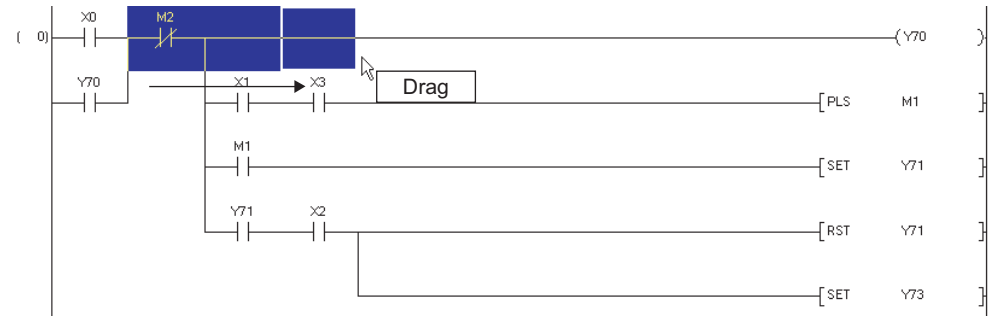
1. **Move the cursor to the position where a column is inserted.**

A column is inserted in front of the cursor position.



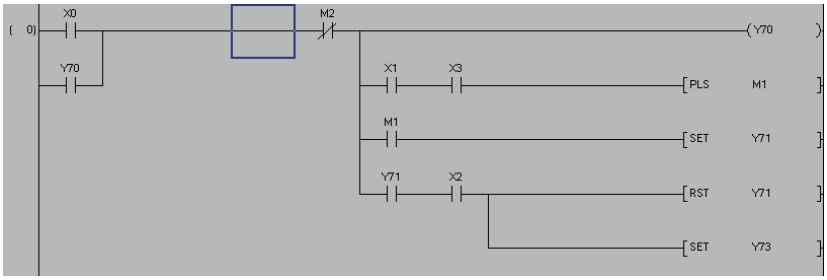

2. **To insert multiple columns, drag the cursor and set the range corresponding to the number of columns to be inserted.**

The columns in the set range are inserted.
On the screen image below, the range for inserting three columns is set.




3. **Select [Edit] ⇒ [Insert Column].**

The columns are inserted. The screen image below shows the insertion of three columns.

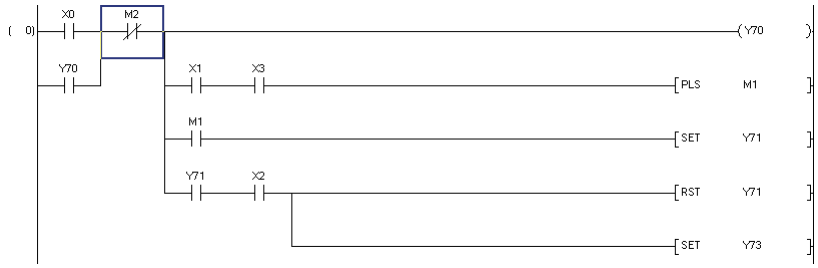


## 6.9.4 Deleting columns

Delete columns. Columns are deleted within the ladder block.

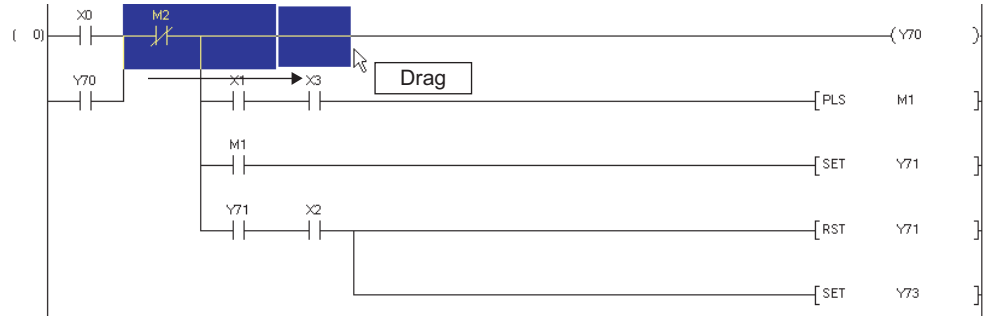
### Operating procedure

1. **Move the cursor to the position where the column is deleted.**



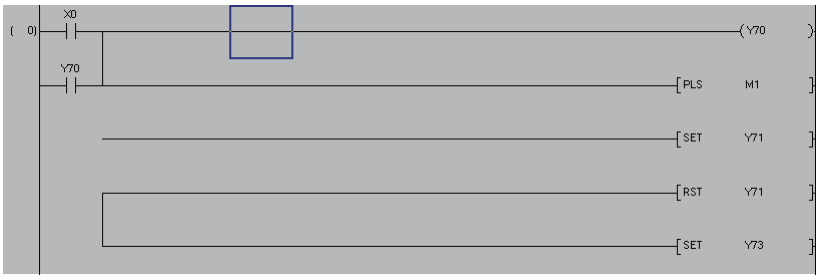

2. **To delete multiple columns, drag the cursor to set the range corresponding to the number of columns to be deleted.**

   The columns in the set range are deleted.
   To delete a single column, it is not necessary to set the range. The column at the cursor position is deleted.




3. **Select [Edit] ⇒ [Delete Column].**

   The columns are deleted. The screen image below shows the deletion of three columns.



# 6.10 Batch Inserting and Deleting NOP Instructions

Q CPU L CPU FX

This section explains how to batch insert and delete NOP instructions.

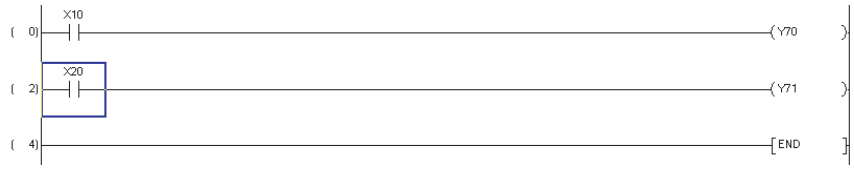
## 6.10.1 Batch inserting NOP instructions

Step numbers of the program can be adjusted by batch inserting NOP instructions.

### Operating procedure

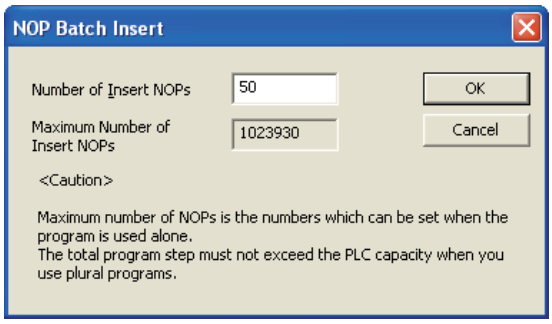
1. **Move the cursor to the position where NOP instructions are inserted.**

   NOP instructions are inserted in front of the cursor position.




2. **Select [Edit] ⇒ [NOP Batch Insert].**

   The NOP Batch Insert screen is displayed.

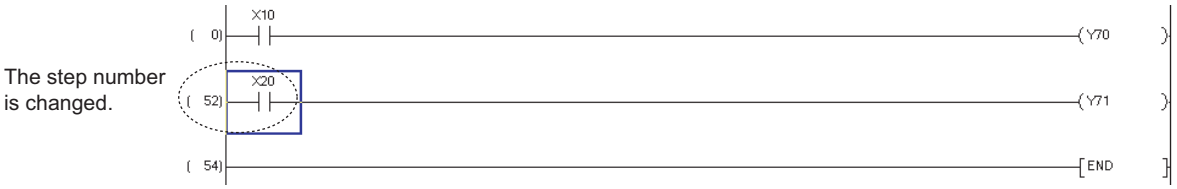



3. **Set the items on the screen.**

| Item | Description |
|---|---|
| Number of Insert NOPs | Set the number of NOP instructions to be inserted. |
| Maximum Number of Insert NOPs | Display a maximum number of NOP instructions that can be inserted. |

4. **Click the OK button.**

   The set number of NOP instructions is inserted in the program.



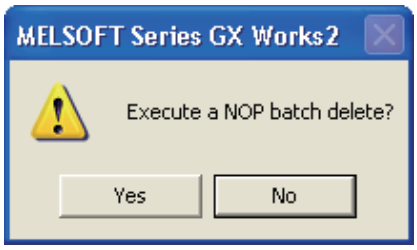
## 6.10.2 Batch deleting NOP instructions

Batch-delete NOP instructions in the program.

### Operating procedure

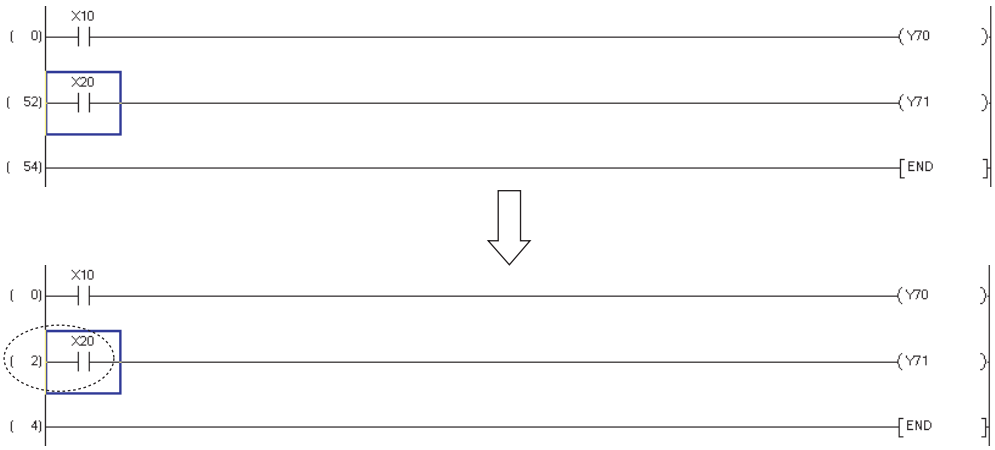
1. **Select [Edit] ⇒ [NOP Batch Delete].**

   The confirmation message is displayed.




2. **Click the Yes button.**

   All NOP instructions in the program are deleted.




The step number is changed.

# 6.11 Cutting, Copying, and Pasting Ladders

Q CPU L CPU FX

This section explains how to cut, copy, and paste existing ladders.

| Item | Toolbar | Shortcut key |
|---|---|---|
| Cut | | Ctrl + X |
| Copy | | Ctrl + C |
| Paste | | Ctrl + V |

## 6.11.1 Pasting cut or copied ladders in unit of instruction

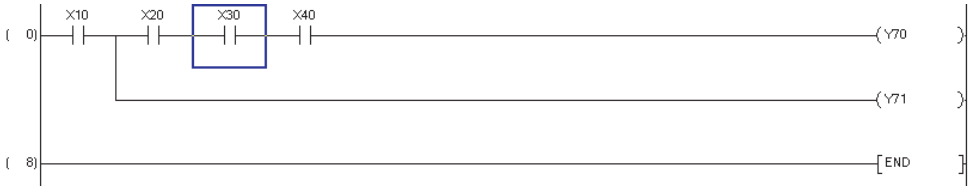
Paste a cut or copied ladder in unit of instruction.

**Restrictions**

**Cutting and copying in unit of instruction are applicable to contacts, coils, application instructions, device comments, and notes. Cutting and copying are not applicable to line statements, P and I statements, and END instructions.**

### Operating procedure

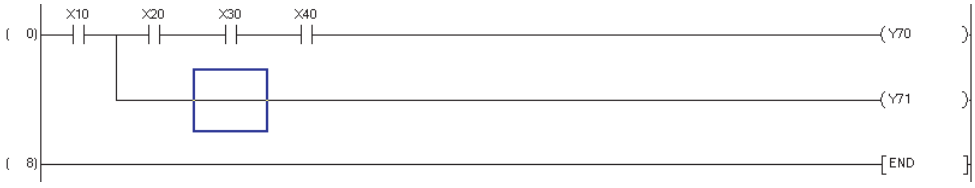
1. **Move the cursor to the position where the instruction is cut or copied.**




2. **Select [Edit] ⇒ [Cut] ( ) or [Copy] ( ).**

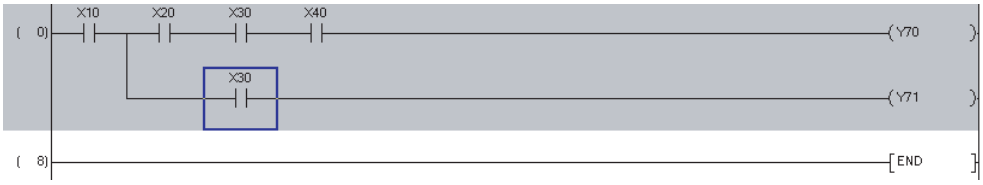
   When [Cut] ( ) is selected, the instruction at the cursor position is deleted.

3. **Move the cursor to the position where the cut or copied instruction is pasted.**



**4.** **Select [Edit] ⇒ [Paste] ( ).**

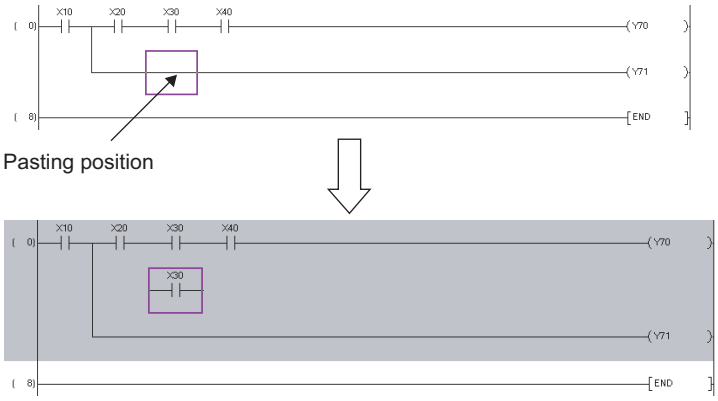
The instruction is pasted.




**Point**

● **Pasting in the 'Insert mode'**

A row is inserted at the cursor position and the instruction is pasted there.

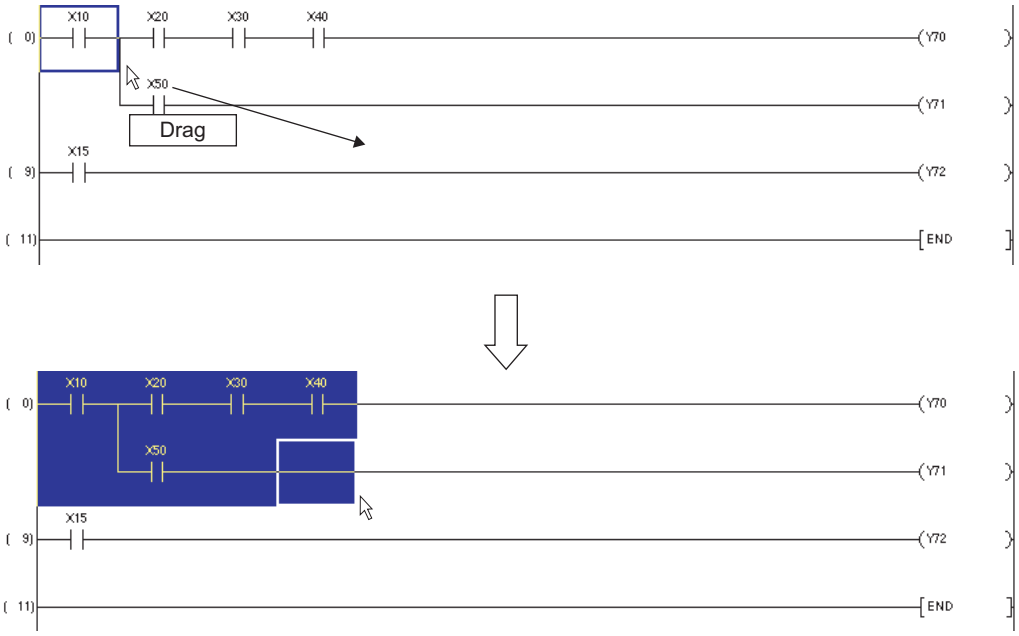


## 6.11.2 Pasting cut or copied ladders by setting a range

Paste cut or copied ladders by setting a range.

### Operating procedure

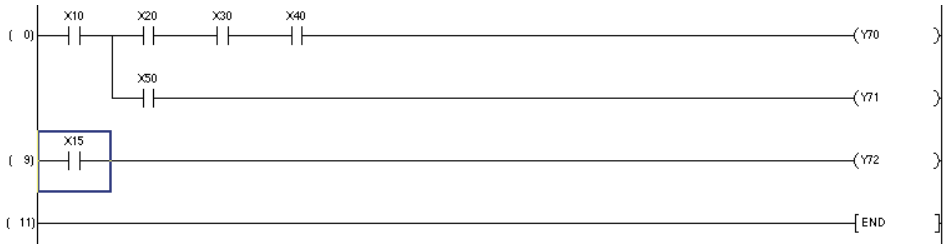
1. **Set the range by dragging the cursor from the start position of cut or copy.**




2. **Select [Edit] ⇒ [Cut] ( ) or [Copy] ( ).**

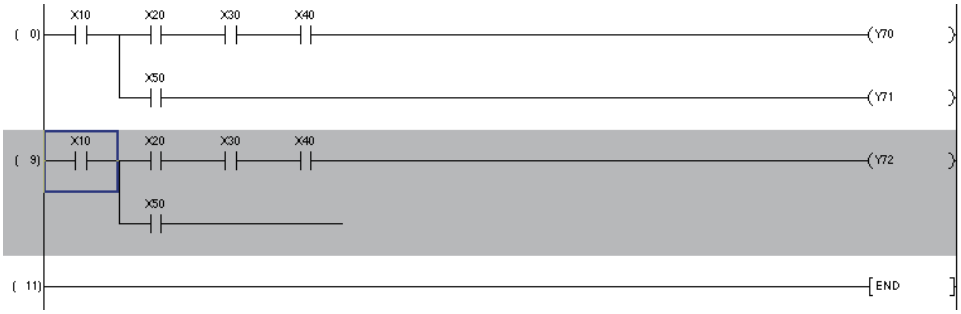
   When [Cut] ( ) is selected, the ladders in the set range are deleted.

3. **Move the cursor to the position where the cut or copied ladders are pasted.**




4. **Select [Edit] ⇒ [Paste] ( ).**

   The ladders are pasted.



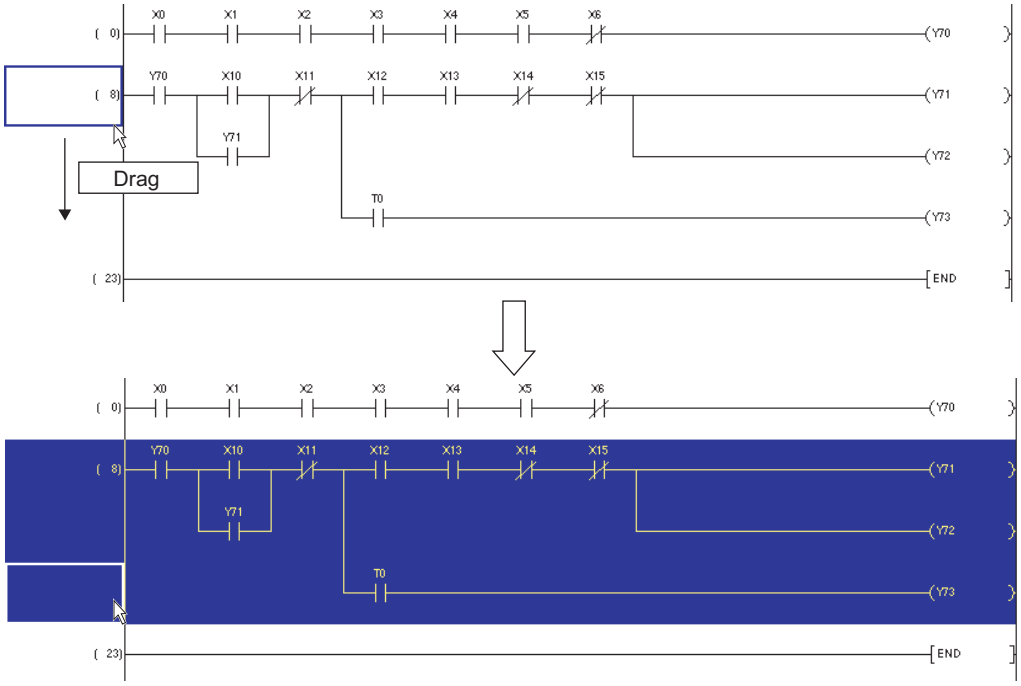
## 6.11.3 Pasting cut or copied ladder block

Paste a cut or copied ladder block.

### Operating procedure

1. **Set the range by dragging the cursor up or down from the start position of cut or copy.**

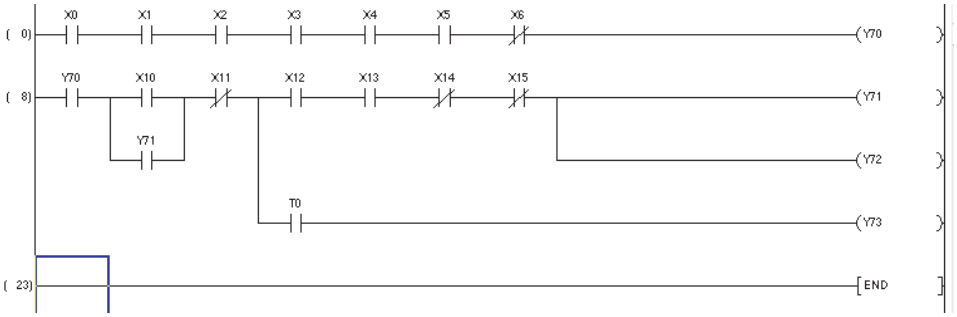
   Specify the range of a ladder block at the position where step numbers are displayed.




2. **Select [Edit] ⇒ [Cut] ( ) or [Copy] ( ).**

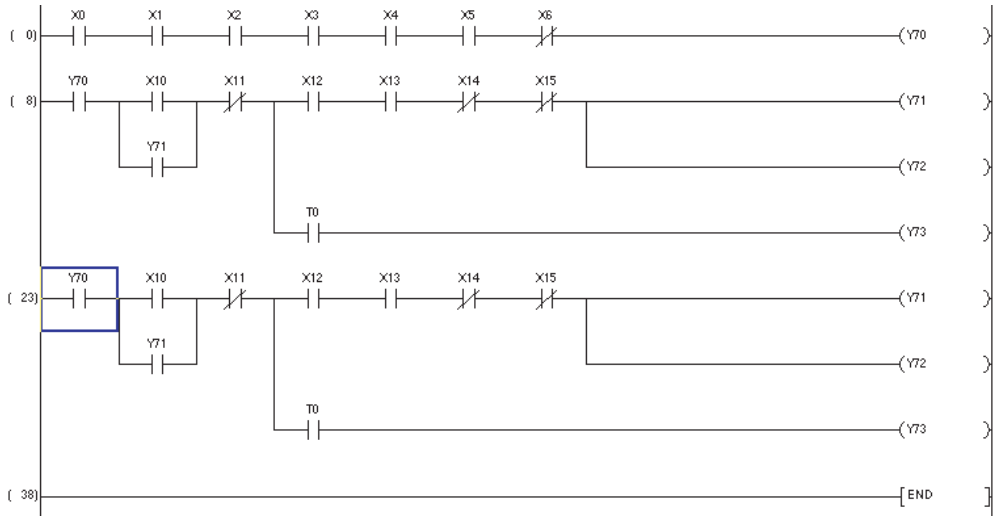
   When [Cut] ( ) is selected, the ladder block in the set range is deleted.

3. **Move the cursor to the position where the cut or copied ladder block is pasted.**



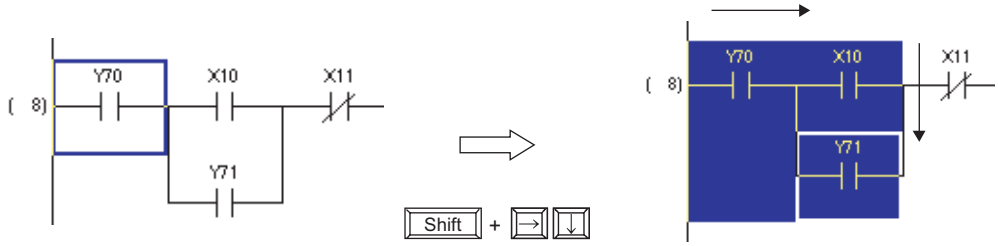
*4.* **Select [Edit] ⇒ [Paste] ( ).**

The ladder block is pasted.



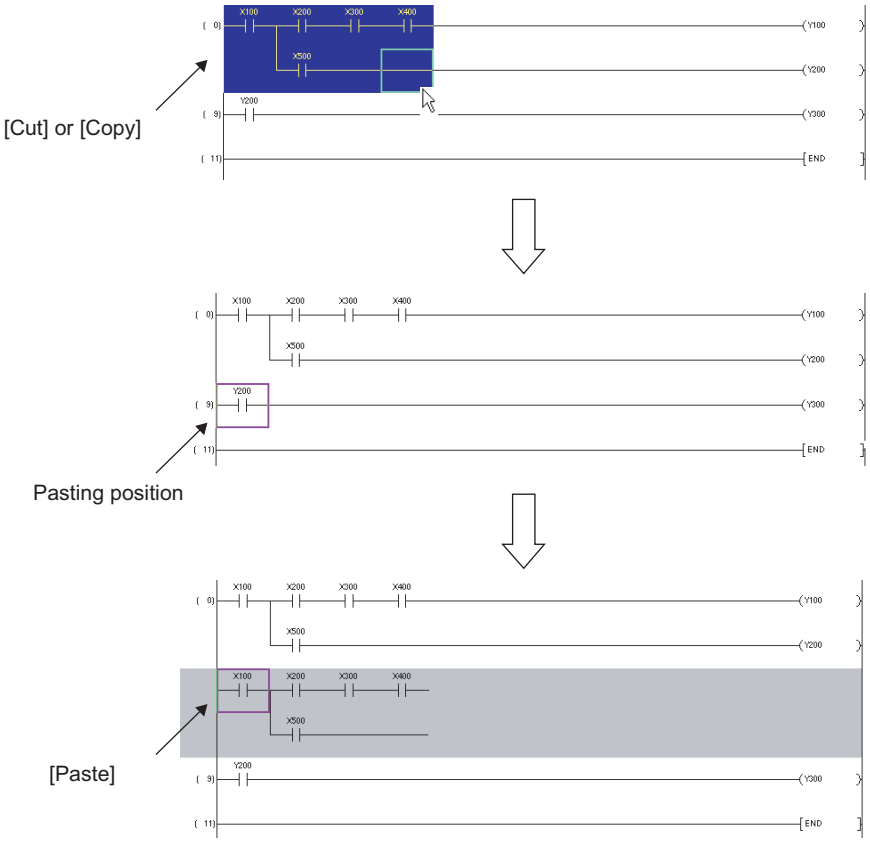
## Point

● **The range can be set by pressing the Shift + ↑ ↓ ← → keys.**

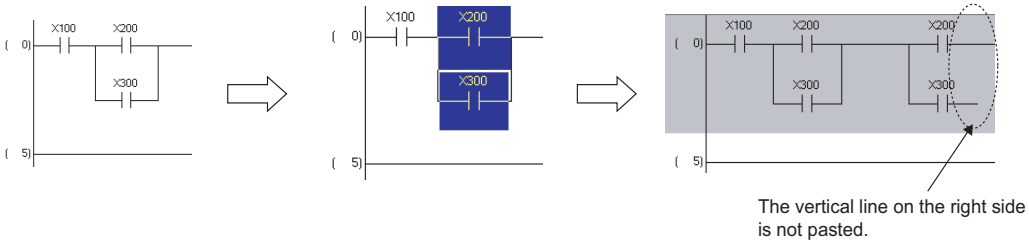



● **Pasting in the 'Insert mode'**

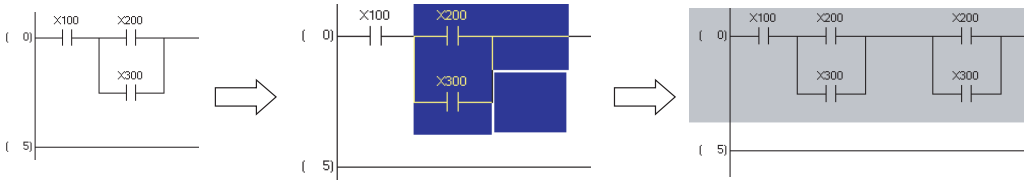
The ladder block is inserted above the cursor position.




● **If the ladders shown below are selected by setting a range, the vertical line on the right side cannot be copied or pasted.**




In such a case, set the range as shown below to copy or paste the ladders.



# 6.12 Canceling Previous Operation

Q CPU L CPU FX

This section explains how to cancel the previous operation to restore the previous status.

| Item | Toolbar | Shortcut key |
|---|---|---|
| Undo |  | Ctrl + Z |

## Operating procedure

- Select [Edit] ⇒ [Undo] () immediately after editing a ladder.
  The processing status just before the last operation is restored.

## 6.12.1 Operation applicability

The following table shows the operation applicability of the Undo function.

Table 6.12.1-1 Operation applicability of the Undo function

| Operation applicability of the Undo function | Reference |
|---|---|
| Create and delete contacts, coils, and application instructions | Section 6.2<br>Section 6.7 |
| Insert and delete rows | Section 6.9 |
| Insert and delete columns | Section 6.9 |
| Edit and delete lines | Section 6.6<br>Section 6.8 |
| Enter and delete vertical lines | Section 6.6.2<br>Section 6.8.2 |
| Enter and delete horizontal lines | Section 6.6.2<br>Section 6.8.2 |
| Cut and paste by setting ranges | Section 6.11 |

# 6.13 Restoring Ladders to the Status of After Conversion

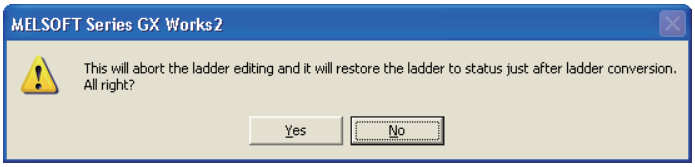
Q CPU L CPU FX

This section explains how to restore the currently edited ladder to the status of immediately after the ladder conversion.

## Operating procedure

1. **Select [Edit] ⇒ [Restore After Ladder Conversion].**

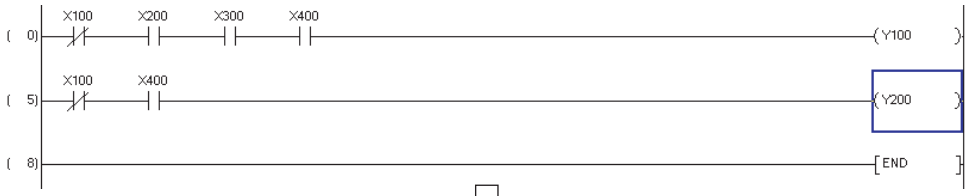
   The confirmation message is displayed.



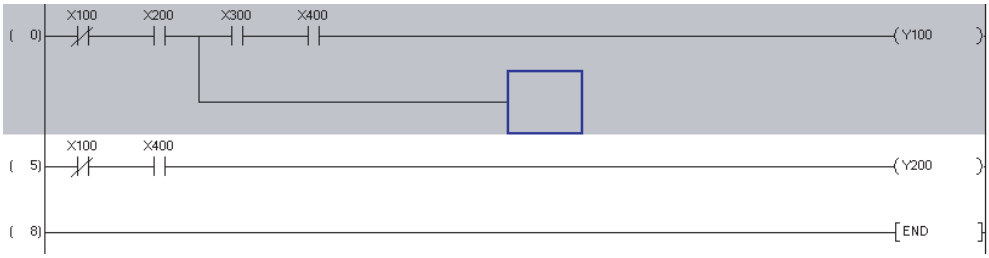

2. **Click the Yes button.**

   The ladder is restored to the status before editing the ladder.

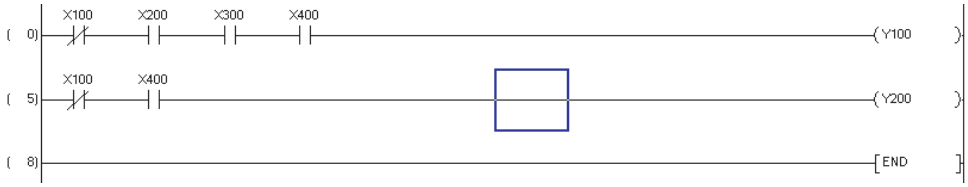
Status after ladder conversion




Edit the ladder.




Execute [Restore After Ladder Conversion].




**Point**

- **Converted ladder cannot be restored to the status before conversion.**

# 6.14 Precautions on Editing Ladders

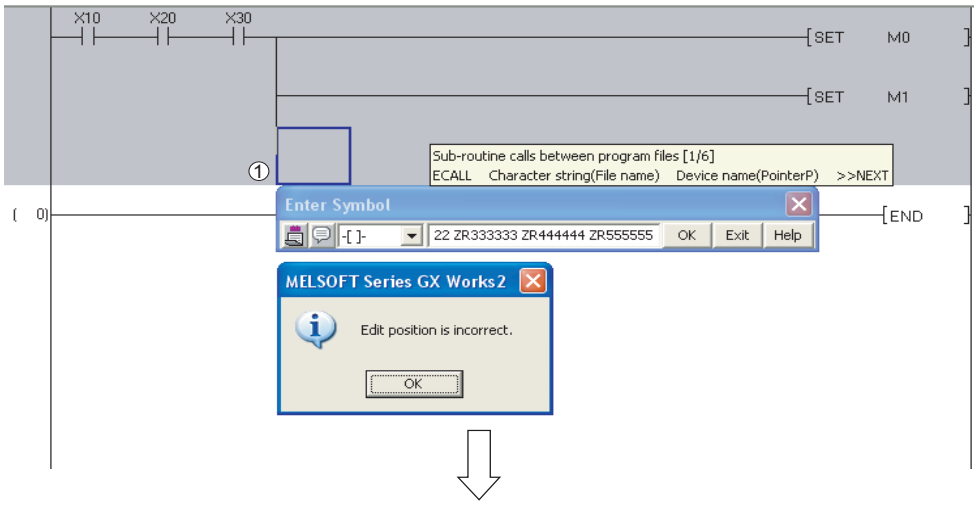
Q CPU L CPU FX

The following explains the precautions on editing ladders.

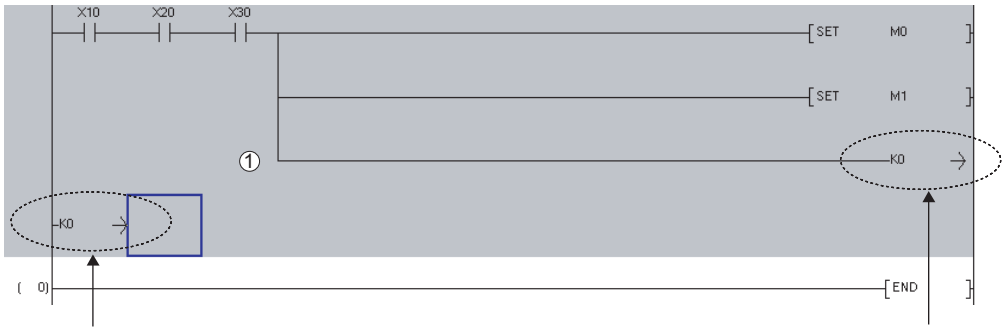
1) For a ladder with a ladder block consisting of two or more rows, if one instruction cannot be fitted in a single row, create wrapping symbols and create the instruction in the next row as shown below.

Example)
To enter the following instruction:
ECALL "abcdefghijklmnopqrstuvw" P1000 ZR111111 ZR222222 ZR333333 ZR444444 ZR555555

An instruction that does not fit in a row cannot be entered in the row ①.
If attempted, the error message "Edit position is incorrect" is displayed.




Wrapping the row ① by creating the wrapping symbols.




Create a wrapping destination symbol (>-).

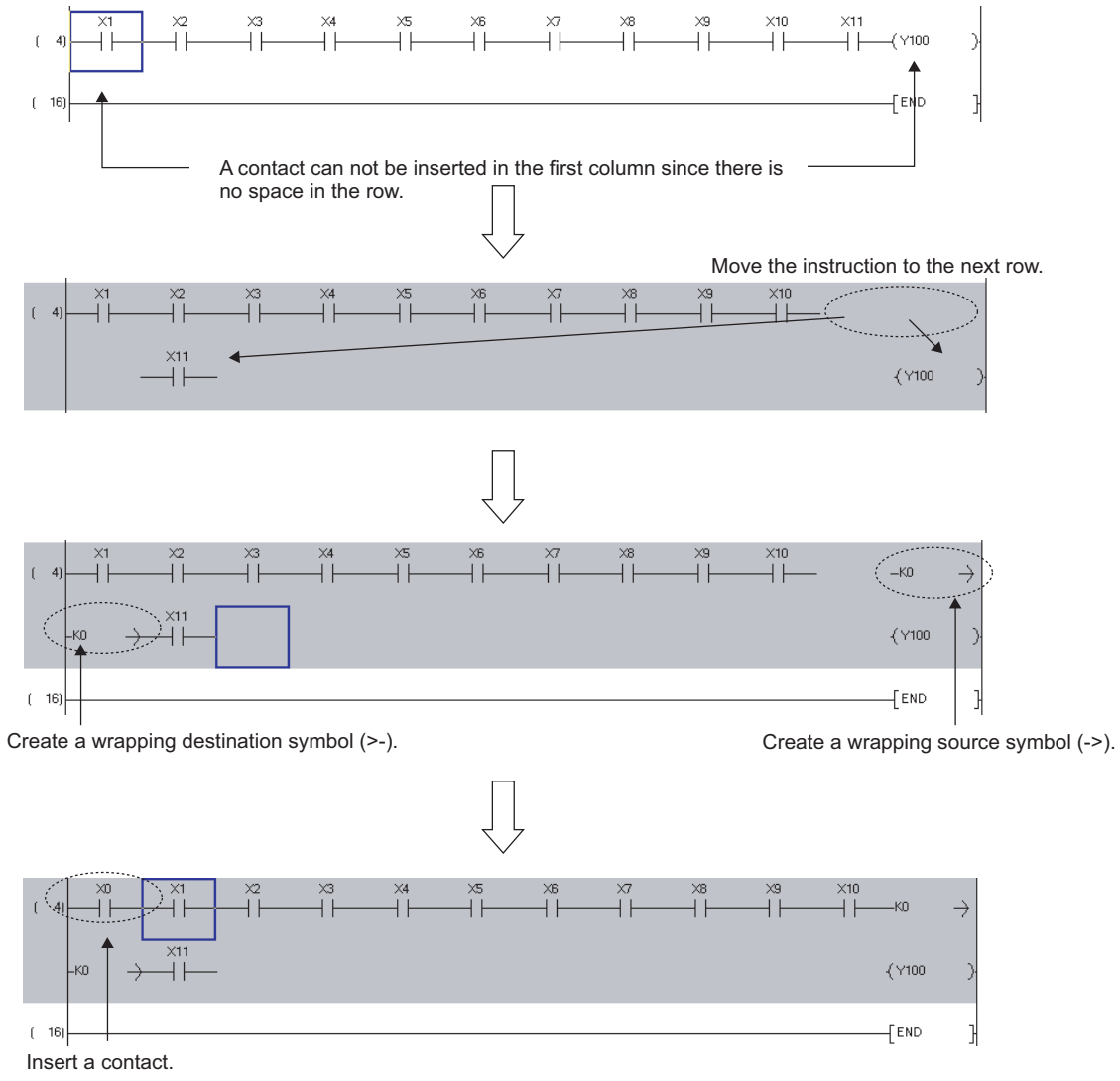
Create a wrapping source symbol (->).

Enter the instruction in the row ②.



2) If wrapping occurs due to the insertion of a contact in the first column, a contact cannot be inserted. In this case, move the instruction to the next row and insert the contact in the first column after connecting the contact with the wrapping symbols.

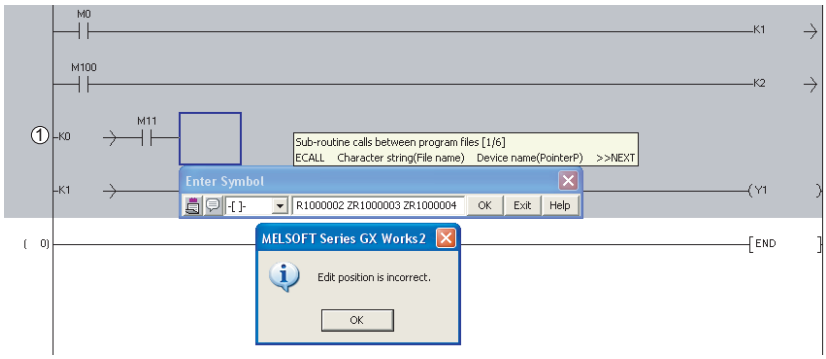
Example)



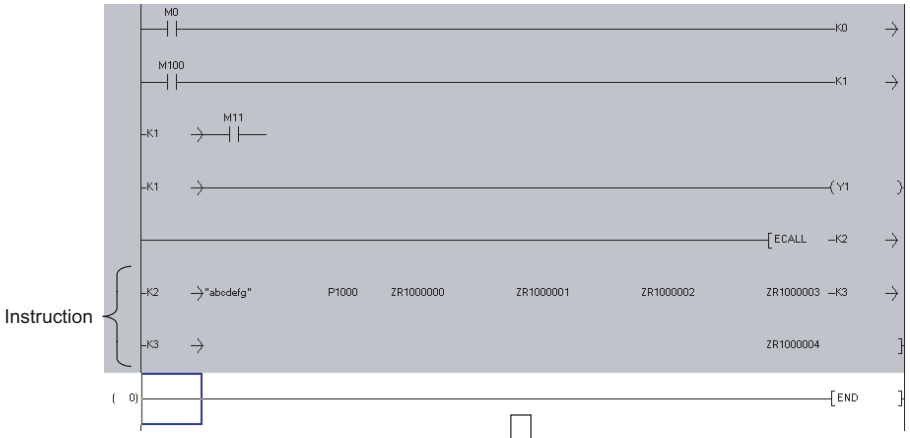
3) When there are two or more wrapping rows, an instruction that causes more wrapping can not be created.
In this case, insert a new row below the existing rows and enter the instruction in that row. Then, adjust the wrapping symbol numbers.

Example)
To enter the following instruction:
ECALL "abcdefg" P1000 ZR1000000 ZR1000001 ZR1000002 ZR1000003 ZR1000004

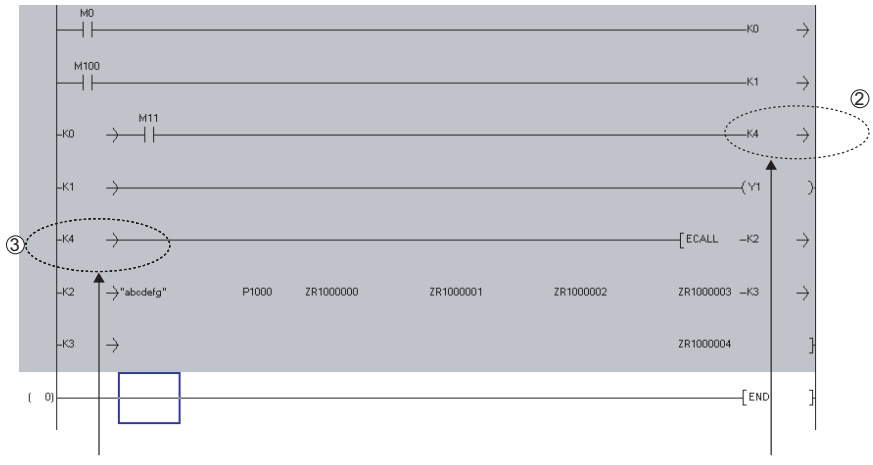
An instruction that does not fit in a row cannot be created in the row ①.
If attempted, the error message is displayed.




In this case, insert a new row and enter the instruction.




Create the wrapping source symbol (->) in the row ②, and create the wrapping destination symbol (>-) in the row ③.

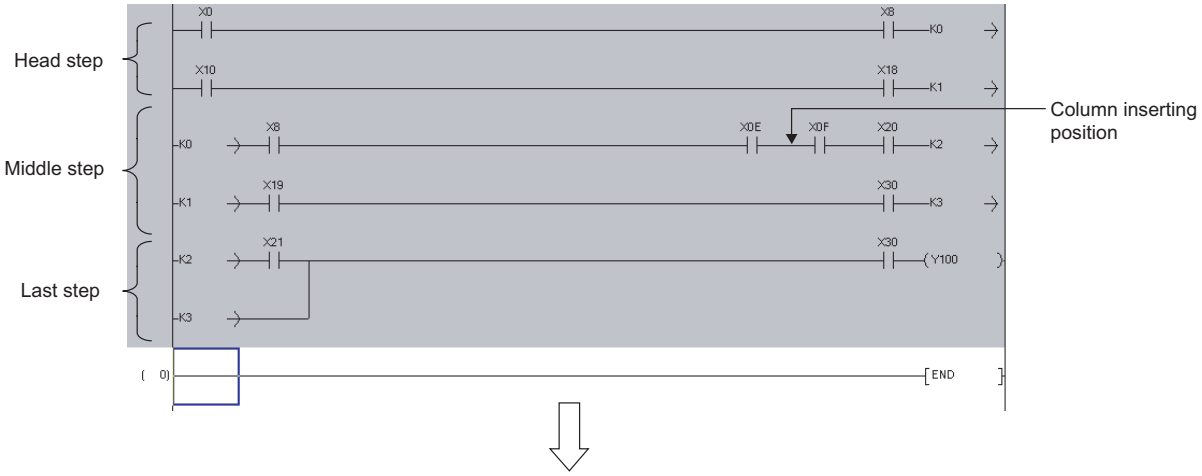



Create a wrapping destination symbol (->).

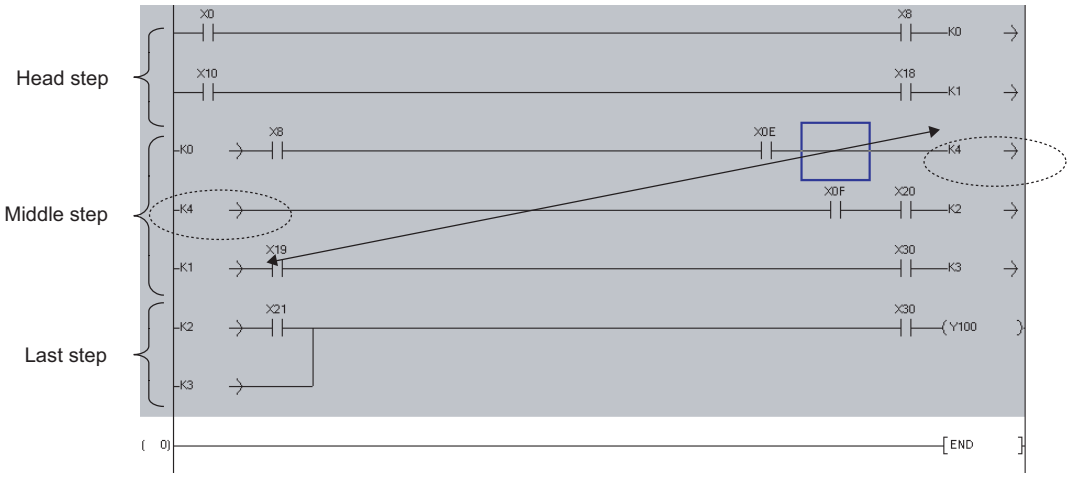
Create a wrapping source symbol (->).

4) If the ladder is edited (such as insertion or deletion of columns) in the middle step of a wrapped ladder, the ladder may not be wrapped correctly, which causes the conversion impossible.
If this happens, make corrections so that the wrapping source symbol (->) number and the wrapping destination symbol (>-) number match correctly.

Example)
A column is inserted in front of [X0F]

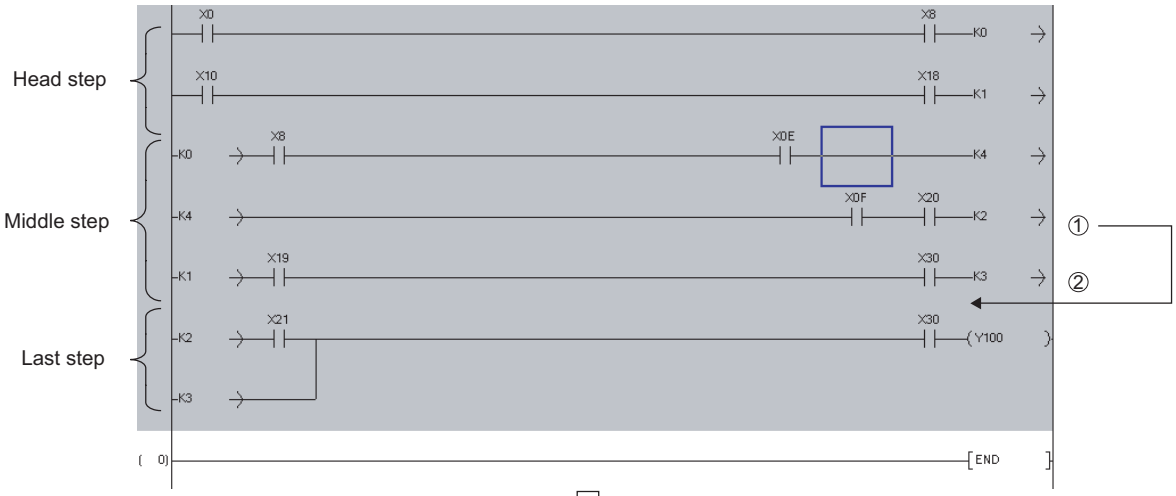



Wrapping source symbol (->) K4 and wrapping destination symbol (>-) K4 are automatically created.
This causes matching failure between the wrapping source symbol (->) K1 and the wrapping destination symbol (>-) K1.

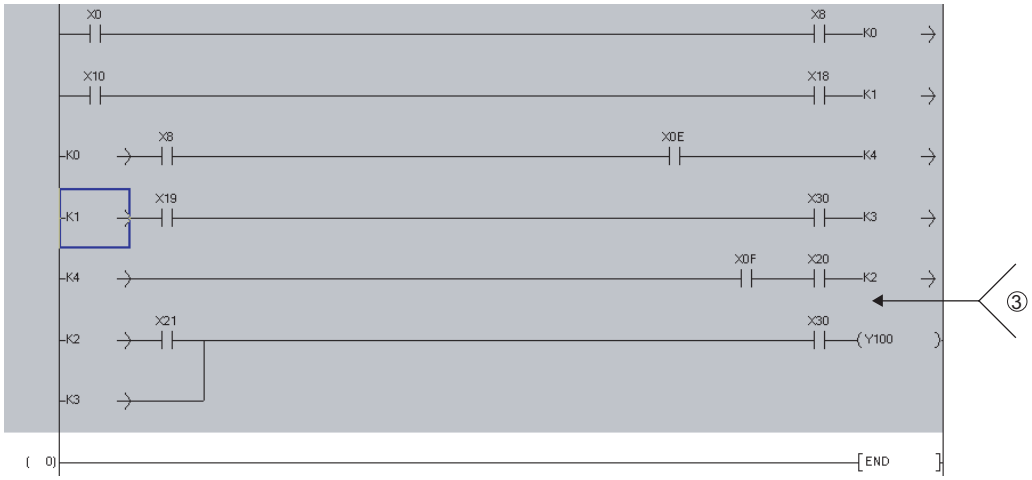


In this case, a correction needs to be made to the ladder so that the wrapping destination symbol (>-) K1 corresponds to the wrapping source symbol (->) K1.

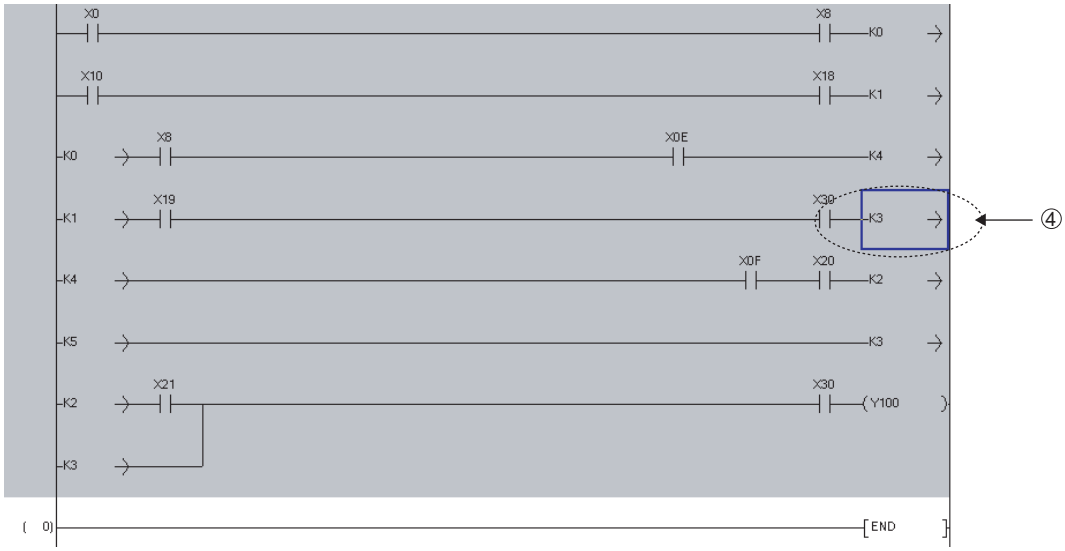
Move row ① below row ②.




Insert a new row to ③, and create the wrapping source symbol (->) with K5 and wrapping destination symbol (>-) with K3.

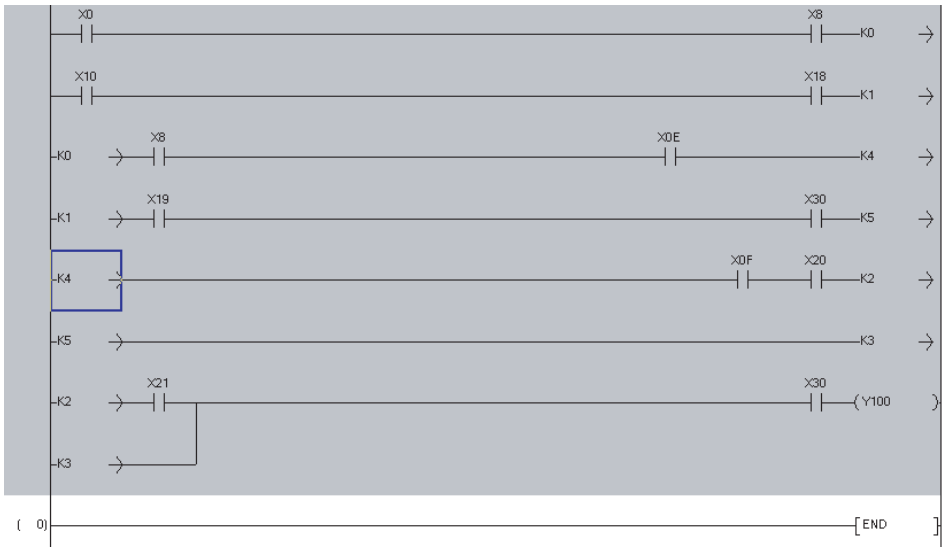


Change the wrapping symbol of ④ to K5.



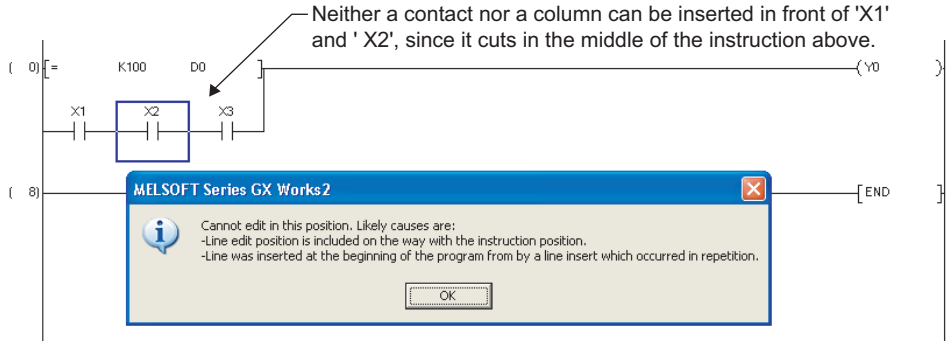



With the corrections above, correspondence between the wrapping source symbols (->) and the wrapping destination symbols (>-) is secured.



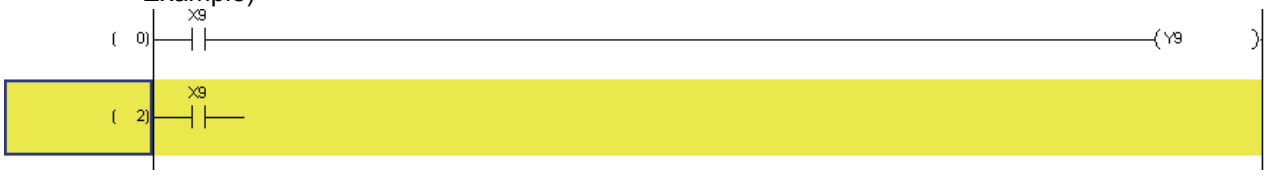

5) A contact or a column cannot be inserted in the middle of an instruction statement.
If attempted, the error message is displayed.

Example)



6) When the ladder block is displayed in yellow, it indicates that the ladder block cannot be displayed properly or an error exists in the program. In this case, perform the program check or compilation to check the error, and correct the program.

Example)



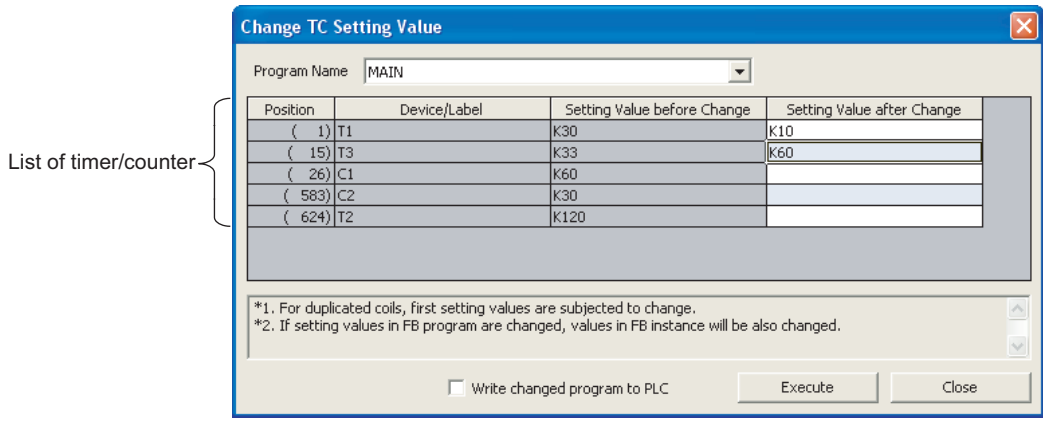
# 6.15 Changing T/C Setting Values

Q CPU L CPU FX

This section explains how to display setting values of timer/counter used in the ladder/SFC (Zoom) program, and changing them in batch.

## Screen display

Select [Edit] ⇒ [Change TC Setting].




## Operating procedure

### 1. Set the items on the screen.

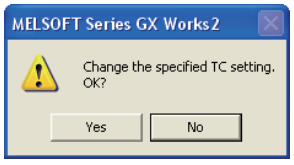
| Item | | Description |
|---|---|---|
| Program Name | | Select a program name whose setting values to be changed by clicking ▼. |
| List of timer/counter | | Display a list of timer/counter of the program selected for "Program Name". |
| | Position | Display step numbers of timer/counter used in the program. |
| | Device/Label | Display devices/labels of timer/counter. |
| | Setting Value before Change | Display the setting values of timer/counter currently set. |
| | Setting Value after Change | Enter the setting values of timer/counter to be changed. |
| Write changed program to PLC*1, *2 | | Check this to write the changes to the programmable controller CPU. |

*1: This item cannot be selected after compiling all programs. For details, refer to the Point in this section. For precautions when compiling all programs, refer to Section 10.3.3.

*2: For FXCPU, this item can be set only for ladder programs of the project without labels.

### 2. Click the Execute button.

The message shown on the right is displayed.




### 3. Click the Yes button.

The setting values are changed.

## Point

● **Changing setting values**
- Constants can be changed to devices, and devices can be changed to constants.
  For the high-speed counter of FXCPU, changing from constants to devices and from devices to constants cannot be performed online.
  Example) K10 to D0
- Devices with index setting cannot be specified.
  Example) D10Z0 cannot be set.
- When a ZR device is set or changed, the changed setting value cannot be written to the programmable controller CPU.
  Example) ZR100 to D100 cannot be set.

● **For Basic model QCPU**

When the date of the personal computer is February 29, the TC setting values may not be changed.
For measures when the TC values cannot be changed, refer to GX Works2 Version 1 Operating Manual (Common).

● **For Universal model QCPU/LCPU**
- Whether to transfer content of the program cache memory to the program memory after setting TC values, can be selected by setting the option. Check the "Transfer program cache memory to program memory" item under [Tool] ⇒ [Options] ⇒ "Online Change".
- The following functions cannot be executed while transferring the program memory after the TC setting value change.
  - Online program change (Ladder, SFC (Zoom), ST, FB)*1
  - TC setting value change (When "Write changed program to PLC" is checked)*1
  - Write to PLC function (When program memory/device memory is the target memory)*1
  - Program memory batch transfer
  - Set as default connection
  - Change PLC Type function
  - Parameter check

  *1: For Universal model QCPU with a serial number of which the first five digits are 12012 or higher, the program memory batch transfer operation can be suspended.
  (☞ GX Works2 Version 1 Operating Manual (Common))

● **Saving project automatically after writing program with changed TC setting values to the programmable controller CPU**
- Projects can be saved automatically after the Online program change by setting the option. Check the "Save project after changes in TC setting values are written to PLC" item under [Tool] ⇒ [Options] ⇒ "Project" ⇒ "Automatic Save".

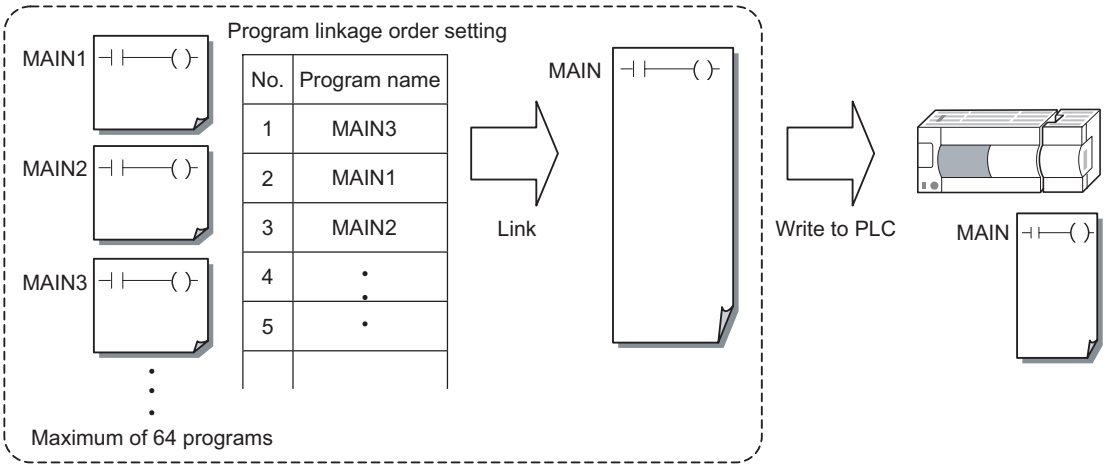
● **"Write changed program to PLC" check box**

When the check box of "Write changed program to PLC" is disabled after compiling all programs, select [Online] ⇒ [Write to PLC] and write programs to the programmable controller CPU to validate the check box.

# 6.16 Setting Program Linkage Order (FXCPU)

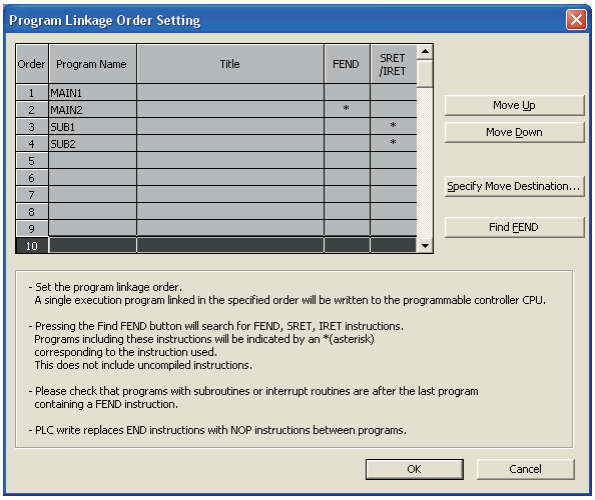
Q CPU L CPU FX

For FXCPU simple project (with labels), execution program can be divided into multiple programs in unit of processes. These programs are linked as one program when writing them to a programmable controller CPU. This section explains how to set the linkage order.
For creating a new program, refer to the following manual.
☞ GX Works2 Version 1 Operating Manual (Common)




## Screen display

Select Project view ⇒ "Program Setting" ⇒ "Execution Program" ⇒ "MAIN".
Right-click and select [Program Linkage Order Setting] from the shortcut menu.



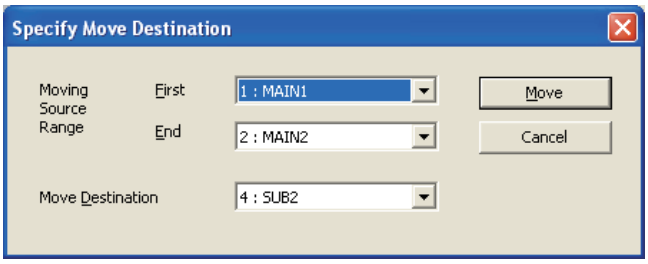

## Operating procedure

- Select a row and click the Move Up / Move Down button to change the order.

## Screen button

● Specify Move Destination...

Displays the Specify Move Destination screen.
Specify the destination for program to be moved.




### Operation

1. Set the items on the screen.

| Item | Description |
|---|---|
| Moving Source Range | Select a first program and end program of moving source range. |
| Move Destination | Select a program of move destination, or "Move to End". |

2. Click the Move button.
The programs selected for "Moving Source Range" are moved to the rows above the program selected for "Move Destination".
When "Move to End" is selected for "Move Destination", the programs are moved to the rows below the end row.

● Find FEND

Searches FEND, SRET, and IRET instructions in each program.
When the instructions exist in the programs, "*" symbols are displayed in the "FEND" or "SRET/IRET" column on the Program Linkage Order Setting screen.

### Point

- **Number of programs that can be created**
  A maximum number of programs that can be created is 64.
- **Subroutine and interrupt programs**
  When creating a subroutine or an interrupt program individually, set the linkage order to execute those programs after the FEND instruction.
- **Program condition after linkage order change**
  After the linkage order is changed on the Program Linkage Order Setting screen, all programs are in the uncompiled status.
- **Security setting**
  The access authority cannot be set for the program linkage order setting.

# MEMO

# 7 EDITING SFC PROGRAMS

This chapter explains the functions of the program editor for editing SFC programs.


7.1 List of SFC Symbols . . . . . 7-2
7.2 Difference between MELSAP3 and MELSAP-L. . . . . 7-6
7.3 Creating SFC Diagrams . . . . . 7-9
7.4 Deleting SFC Diagrams. . . . . 7-27
7.5 Changing SFC Step Attributes. . . . . 7-29
7.6 Cutting, copying, and pasting SFC diagrams. . . . . 7-30
7.7 Sorting SFC Step/Transition Numbers of SFC Diagram . . . 7-32
7.8 Redisplaying SFC Diagrams . . . . . 7-33
7.9 Creating Operation Outputs and Transition Conditions . . . 7-34
7.10 Setting Block Information. . . . . 7-41
7.11 Displaying SFC Block List . . . . . 7-42
7.12 Setting Parameters for SFC Programs . . . . . 7-45
7.13 Precautions on Creating Programs in MELSAP-L . . . . . 7-48
7.14 Changing T/C Setting Values . . . . . 7-50

# 7.1 List of SFC Symbols

Q CPU L CPU FX

The following tables show the list of symbols used in SFC programs.

## ■ QCPU (Q mode)/LCPU

Table 7.1-1 List of SFC symbols for QCPU (Q mode)/LCPU (1/3)

| Category | Name | | Symbol | | Remarks |
|---|---|---|---|---|---|
| | | | MELSAP3 | MELSAP-L | |
| SFC step | Initial step | SFC step 0 | 0 | 0 | Any one of these steps in a single block<br>Initial step number at top left (first column) is fixed to 0.<br><br>n: Reset destination step number |
| | Dummy initial step | | 0 | 0 | |
| | Stored coil initial step | | 0 | 0 | |
| | Stored operation - without transition check | | 0 | 0 | |
| | Stored operation - with transition check | | 0 | 0 | |
| | Reset initial step | | 0 Sn | Sn 0 | |
| | Initial step | Initial step other than SFC step 0 | i | i | Up to the total of 31 steps in a single block<br><br>i: Step number (1 to 511)<br>n: Reset destination step number |
| | Dummy initial step | | i | i | |
| | Stored coil initial step | | i | i | |
| | Stored operation - without transition check | | i | i | |
| | Stored operation - with transition check | | i | i | |
| | Reset initial step | | i Sn | Sn i | |
| | Step | Other than initial step | i | i | Including initial steps, up to 512 steps in a single block<br>(128 steps for Basic model QCPU)<br><br>i: Step number (1 to 511)<br>n: Reset destination step number<br>m: Start destination step number |
| | Dummy step | | i | i | |
| | Stored coil initial step | | i | i | |
| | Stored operation - without transition check | | i | i | |
| | Stored operation - with transition check | | i | i | |
| | Reset step | | i Sn | Sn i | |
| | Block start step (with END check) | | i Bm | Bm i | |
| | Block start step (without END check) | | i Bm | Bm i | |
| | End step | | | | Multiple steps can be applied in a single block |

Table 7.1-1 List of SFC symbols for QCPU (Q mode)/LCPU (2/3)

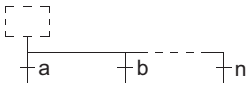
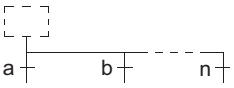
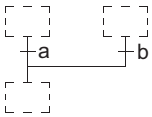
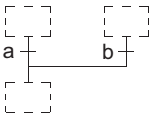
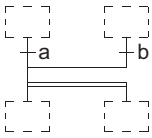
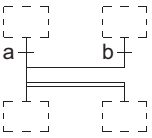
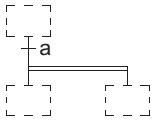
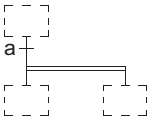
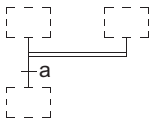
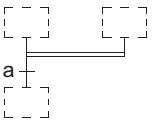
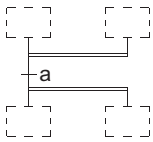
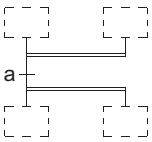
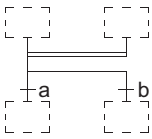
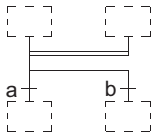
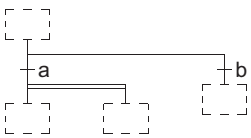
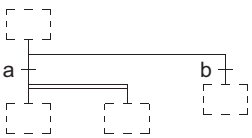
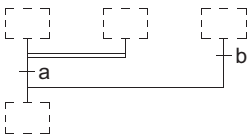
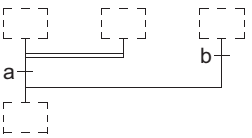
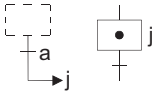
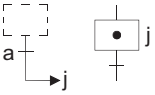
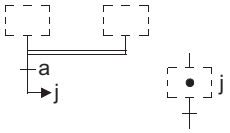
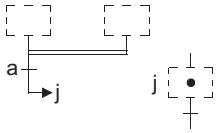
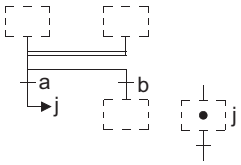
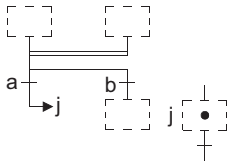
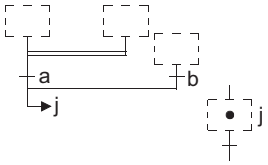
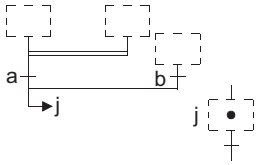
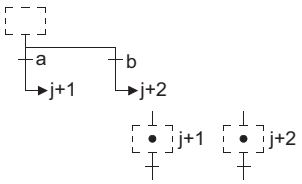
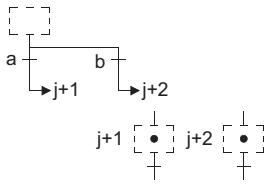
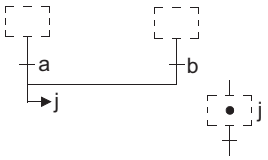
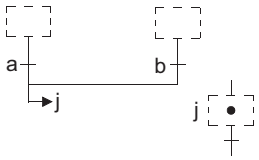
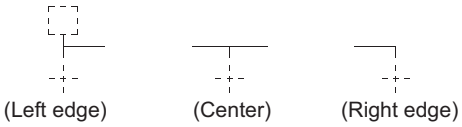
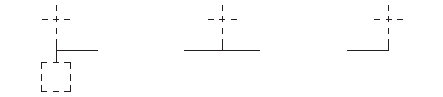
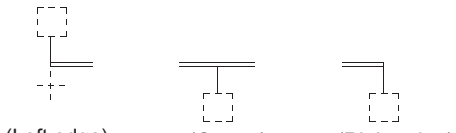
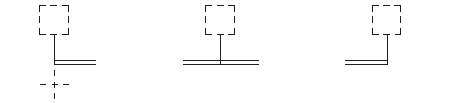
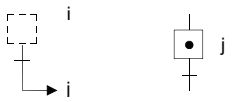
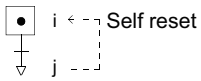
| Category | Name | Symbol | | Remarks |
|---|---|---|---|---|
| | | MELSAP3 | MELSAP-L | |
| Transition | Series transition |  |  | a, b: Transition condition number |
| | Selection divergence |  |  | |
| | Selection convergence |  |  | |
| | Selection convergence - simultaneous divergence |  |  | |
| | Simultaneous divergence |  |  | |
| | Simultaneous convergence |  |  | |
| | Simultaneous convergence - simultaneous divergence |  |  | |
| | Simultaneous convergence - selection divergence |  |  | |
| | Selection divergence - simultaneous divergence |  |  | |
| | Simultaneous convergence - selection convergence |  |  | |
| | Jump |  |  | a: Transition condition number<br>j: Jump destination step number |

Table 7.1-1 List of SFC symbols for QCPU (Q mode)/LCPU (3/3)

| Category | Name | Symbol | | Remarks |
|---|---|---|---|---|
| | | MELSAP3 | MELSAP-L | |
| Transition | End step transition |  |  | a, b: Transition condition number<br>j: Jump destination step number |
| | Simultaneous convergence - jump |  |  | |
| | Simultaneous convergence - selection divergence - jump |  |  | |
| | Simultaneous convergence - selection convergence - jump |  |  | |
| | Selection divergence - jump |  |  | |
| | Selection convergence - jump |  |  | |

## ■ FXCPU

Table 7.1-2 List of SFC symbols for FXCPU

| Category | Name | Symbol | Remarks |
|---|---|---|---|
| Ladder | Ladder block |   | Up to 11 blocks in a block list |
| Step | Initial step |   | One step in each block<br>i: Step number (0 to 9) |
| | Step |   | Up to 512 steps in each block<br>i: Step number (10 to 999) |
| Transition | Series transition |   | |
| | Selection divergence |   | |
| | Selection convergence |   | |
| | Simultaneous divergence |   | |
| | Simultaneous convergence |   | |
| | JUMP transition |   | i: Step number<br>j: Jump destination step number |
| | Reset JUMP |   | |

# 7.2 Difference between MELSAP3 and MELSAP-L

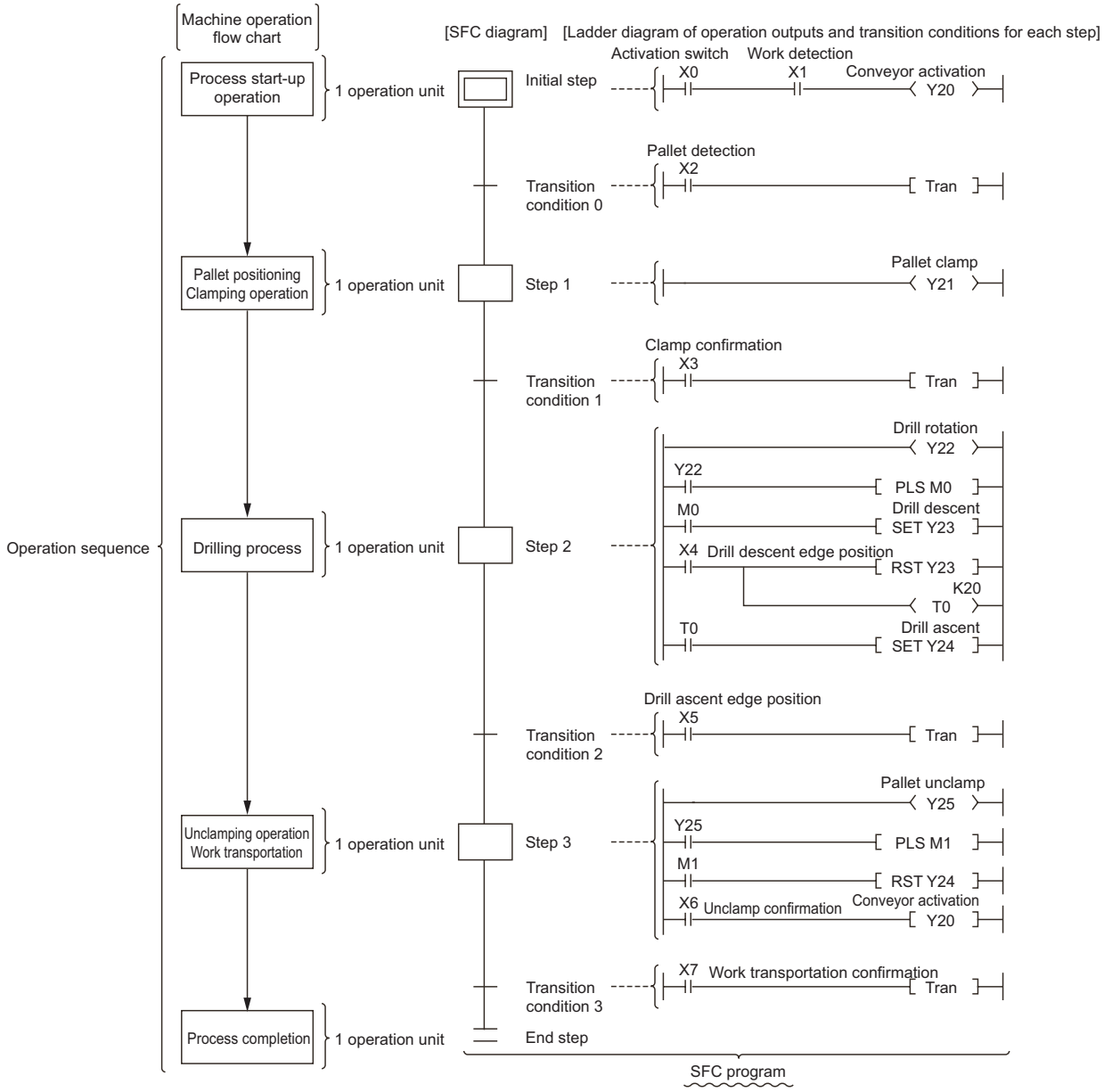
Q CPU L CPU FX

This section explains the difference between MELSAP3 and MELSAP-L.

A display format can be selected for QCPU (Q mode)/LCPU.
For details, refer to Section 2.3.6.

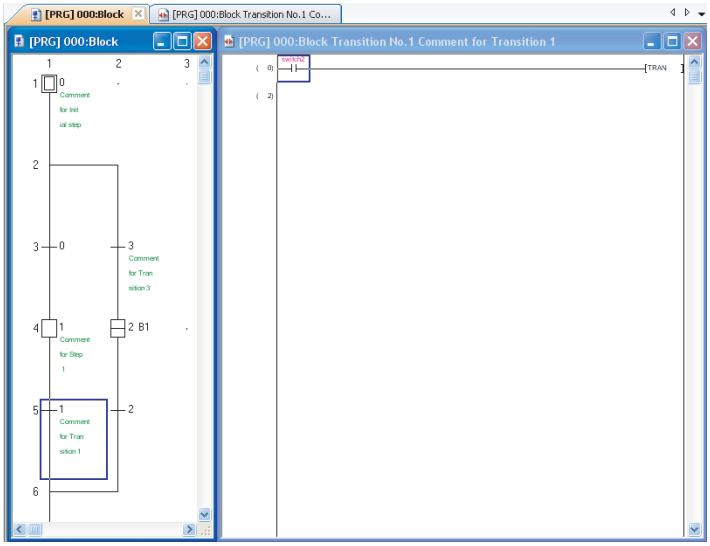
## ■ MELSAP3

MELSAP3 is a description format which provides easy-to-understand configurations and controls of an entire program by describing the operating order of machines and equipment using SFC diagrams and creating operation outputs and transition conditions using ladder programs.



Create programs on the SFC editor window and the Zoom editor window when displaying SFC programs in MELSAP3.
Edit SFC diagrams on the SFC editor window and create operation output/transition condition programs on the Zoom editor window.

MELSAP3




## ■ MELSAP-L

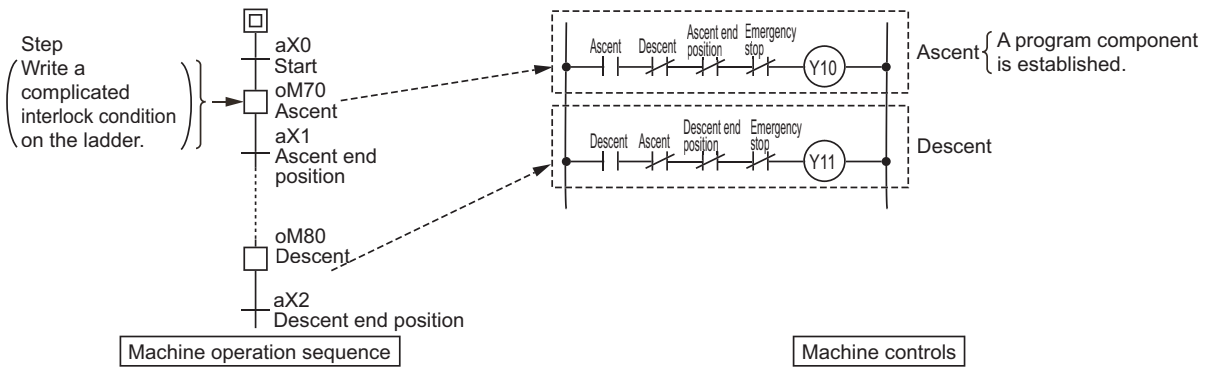
MELSAP-L is a description format which supports development efficiency of sequence programming and establishment of program components.
Each machine control command can be established as a component by describing operation flow and machine controls separately, as in describing a machine operation sequence in MELSAP-L and controls with machine interlocks in sequence program.
Furthermore, since output conditions such as interlocks cannot be written in MELSAP-L steps, a corrective action can be performed instantly for a such trouble in which the step output cannot be detected even though the step is activated.

< MELSAP-L side >

The operation flow is easy to understand by creating SFC programs relating to interlock conditions.

< Sequence program side >

Program components can be established by creating programs contain interlock conditions regardless of the operation flow.



Create programs using only the SFC editor window when displaying SFC programs in MELSAP-L. Both operations of editing SFC diagrams and creating operation output/transition condition programs are performed on the SFC editor window.

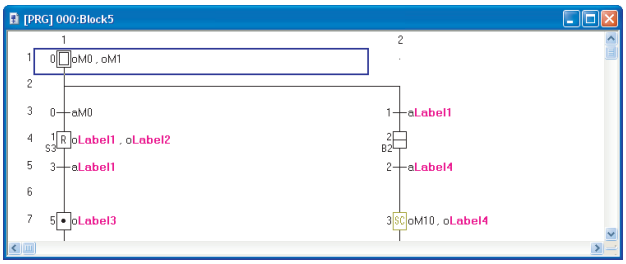
● MELSAP-L (instruction format)

A format to describe control instructions and transition conditions in steps on the SFC diagram. Control programs and transition conditions can be checked on the SFC diagram.

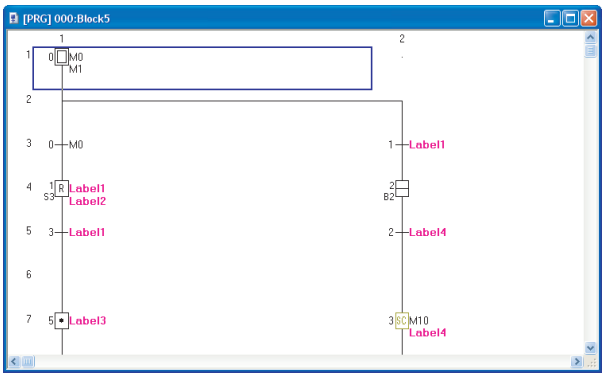
● MELSAP-L (start conditions format)

A format to describe start conditions and transition conditions in steps on the SFC diagram. Operation outputs (OUT) and transition conditions (LD, LDI) can be easily entered using only devices/labels, and they can be checked on the SFC diagram.

MELSAP-L (instruction format)




MELSAP-L (start conditions format)



# 7.3 Creating SFC Diagrams

This section explains how to create SFC diagrams.
For FXCPU, a ladder block to activate the initial step of SFC program needs to be created separately from the SFC diagram.
☞ GX Works2 Version 1 Operating Manual (Common)
SFC symbols are entered by using the Enter SFC Symbol screen.

SFC symbols also can be entered by using the toolbar and shortcut keys. The following table shows the toolbar icons and the corresponding shortcut keys.

| Item | | Toolbar | Shortcut key |
|---|---|---|---|
| SFC Symbol | Step |  | F5 |
| | Block Start Step (with END Check) |  | F6 |
| | Block Start Step (without END Check) |  | Shift + F6 |
| | Jump |  | F8 |
| | END Step |  | F7 |
| | Dummy Step |  | Shift + F5 |
| | Transition |  | F5 |
| | Selection Divergence |  | F6 |
| | Simultaneous Divergence |  | F7 |
| | Selection Convergence |  | F8 |
| | Simultaneous Convergence |  | F9 |
| | Vertical Line |  | Shift + F9 |
| SFC Step Attribute | No Attribute |  | Ctrl + 1 |
| | Stored Coil |  | Ctrl + 2 |
| | Stored Operation (without Transition Check) |  | Ctrl + 3 |
| | Stored Operation (with Transition Check) |  | Ctrl + 4 |
| | Reset |  | Ctrl + 5 |
| Edit Line | Vertical Line Segment |  | Alt + F5 |
| | Selection Divergence |  | Alt + F7 |
| | Simultaneous Divergence |  | Alt + F8 |
| | Selection Convergence |  | Alt + F9 |
| | Simultaneous Convergence |  | Alt + F10 |
| Delete Line | |  | Ctrl + F9 |
| Documentation | SFC Step/Transition Comment |  | |
| Sort SFC Step No. | |  | |
| Monitor | SFC All Block Batch Monitoring |  | |
| | SFC Auto Scroll |  | |
| View | Zoom |  | |

## 7.3.1 Entering SFC steps (□)/(▣)/(⊠)

Q CPU L CPU FX

Enter a SFC step.

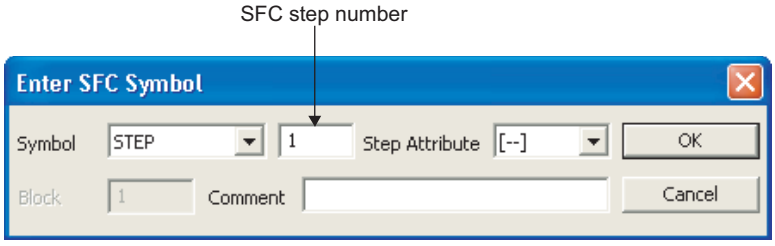
### Operating procedure

1. **Move the cursor to the position where a SFC step is entered.**

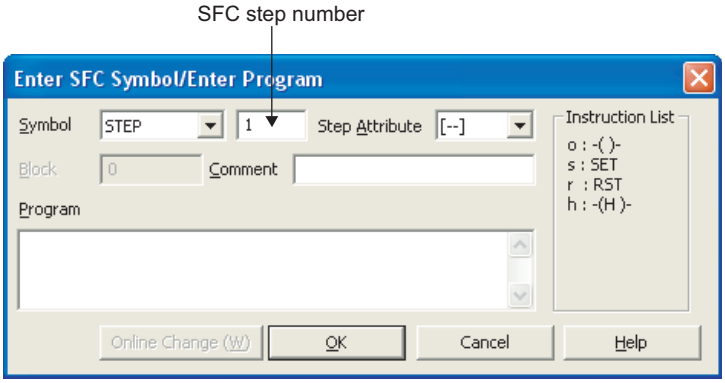
2. **Select [Edit] ⇒ [SFC Symbol] ⇒ [Step]/[Dummy Step].**

   The Enter SFC Symbol or the Enter SFC Symbol/Enter Program screen is displayed in accordance with the display format setting.

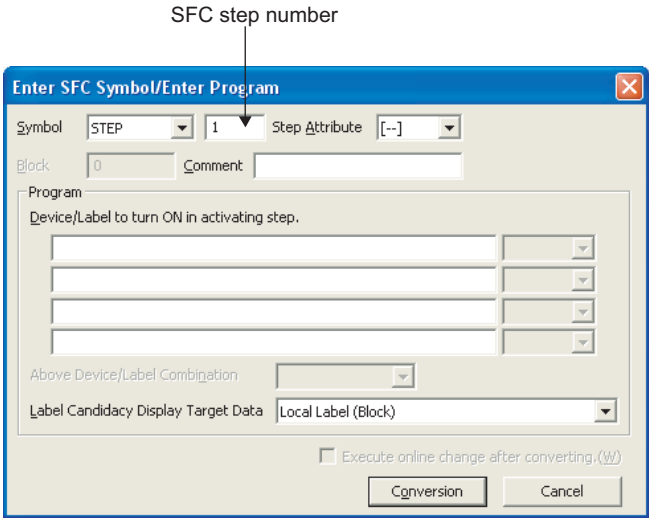
   < MELSAP3/FXCPU >




   < MELSAP-L (instruction format) >




   < MELSAP-L (start conditions format) >



### 3. Set the items on the screen.

| Item | Description |
|---|---|
| Symbol | Select "STEP" or "DUMMY".<br>Dummy steps are changed to the SFC step display automatically when the operation output program is created. |
| SFC step number | Enter a SFC step number. |
| Step Attribute | Select the SFC step attribute.<br>This setting can be set when "STEP" is selected for "Symbol". |
| Block/Reset*1 | Enter a reset destination step number when the reset step "R" is selected for "Step Attribute". |
| Comment | Enter SFC step comments. Up to 32 characters can be entered. The created comments can be displayed by selecting [View] ⇒ [SFC Step/Transition Comment]. |
| Program*2 | Enter programs.<br>For entering MELSAP-L programs, refer to the following section.<br>(☞ Section 7.9.2, Section 7.9.3) |

*1: Not supported by FXCPU.

*2: Applicable to MELSAP-L (instruction format) and MELSAP-L (start conditions format).

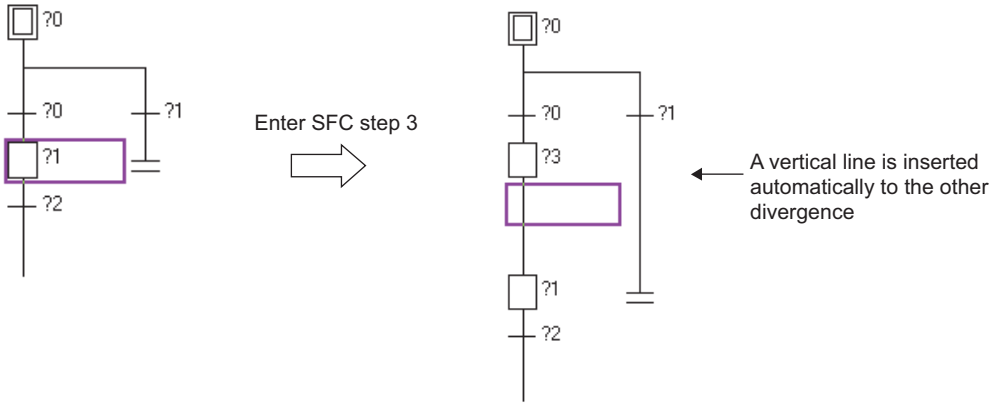
### 4. Click the OK button.

The entered SFC step symbol is displayed.

<Overwrite mode>




<Insert mode>




**Point**

● **Changing the SFC step attributes**
The SFC step attributes of created SFC steps can be changed by selecting [Edit] ⇒ [SFC Step Attribute] ⇒ [(SFC step attribute)]. (☞ Section 7.5)

## 7.3.2 Entering block start steps ( )/( )

Q CPU L CPU FX

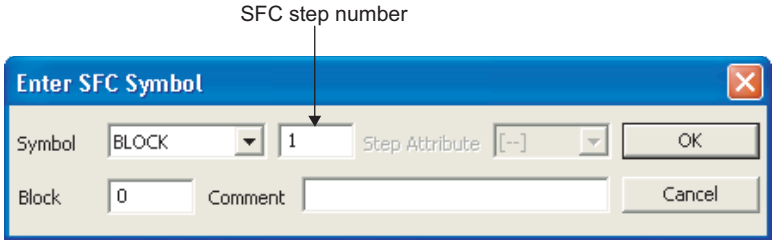
Enter a block start step.

### Operating procedure

1. **Move the cursor to the position where a block start step is entered.**
2. **Select [Edit] ⇒ [SFC Symbol] ⇒ [Block Start Step (with END Check)]/[Block Start Step (without END Check)].**

   The Enter SFC Symbol screen or the Enter SFC Symbol/Enter Program screen is displayed in accordance with the display format setting.

   < MELSAP3/FXCPU >



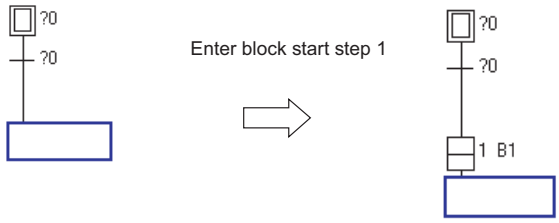

3. **Set the items on the screen.**

| Item | Description |
|---|---|
| Symbol | Select "BLOCK" or "BLOCK-S". |
| SFC step number | Enter a SFC step number. |
| Step Attribute | (This setting is not required.) |
| Block | Enter a start destination block number. |
| Comment | Enter SFC step comments. Up to 32 characters can be entered. |

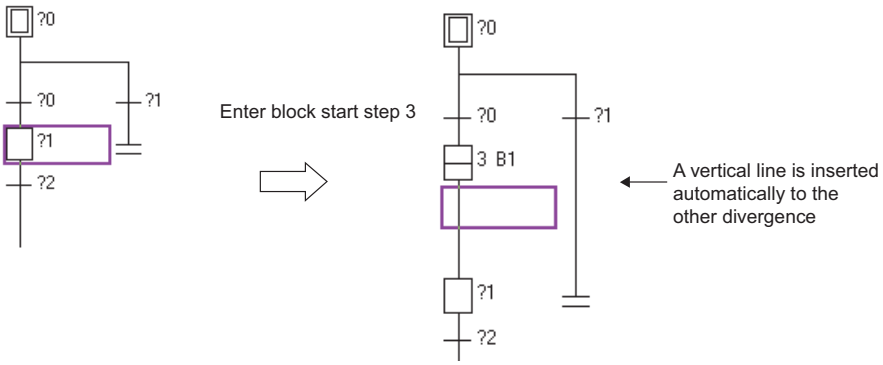
4. **Click the OK button.**

The entered block start step symbol is displayed.

<Overwrite mode>




<Insert mode>



## 7.3.3 Entering series transitions ( ┼ )

Q CPU L CPU FX

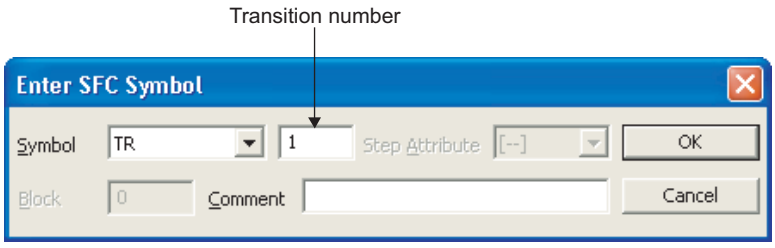
Enter a series transition.

### Operating procedure

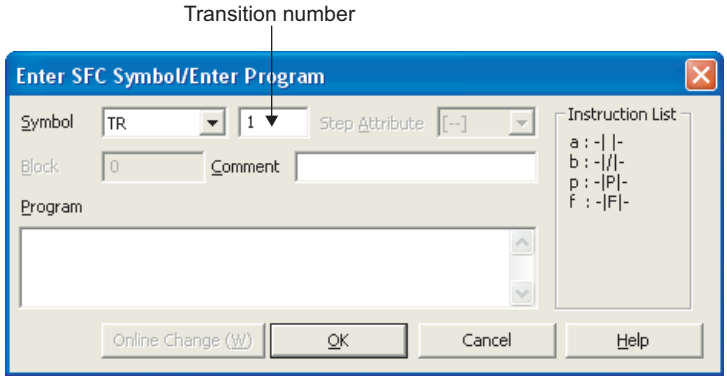
1. **Move the cursor to the position where a series transition is entered.**
2. **Select [Edit] ⇒ [SFC Symbol] ⇒ [Transition].**

   The Enter SFC Symbol screen or the Enter SFC Symbol/Enter Program screen is displayed in accordance with the display format setting.

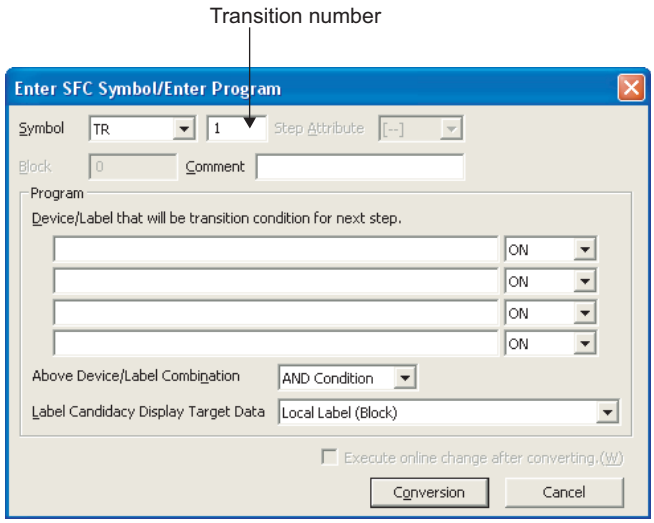
   < MELSAP3/FXCPU >




< MELSAP-L (instruction format) >




< MELSAP-L (start conditions format) >



### 3. Set the items on the screen.

| Item | Description |
|---|---|
| Symbol | Select "TR". |
| Transition number | Enter a transition number. |
| Step Attribute | (This setting is not required.) |
| Block | (This setting is not required.) |
| Comment*1 | Enter transition comments. Up to 32 characters can be entered. |
| Program*2 | Enter programs.<br>For entering MELSAP-L programs, refer to the following section.<br>(☞ Section 7.9) |

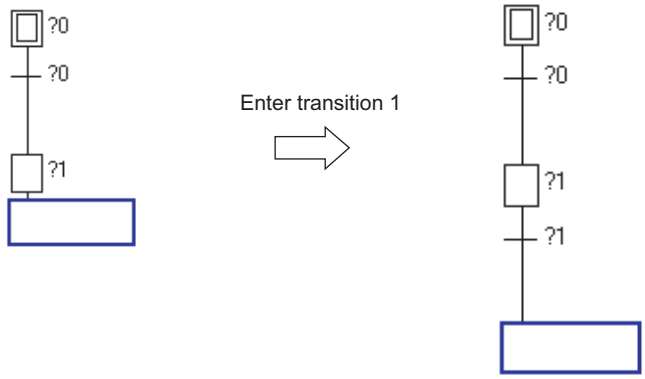
*1: Not supported by FXCPU.

*2: Applicable to MELSAP-L (instruction format) and MELSAP-L (start conditions format).

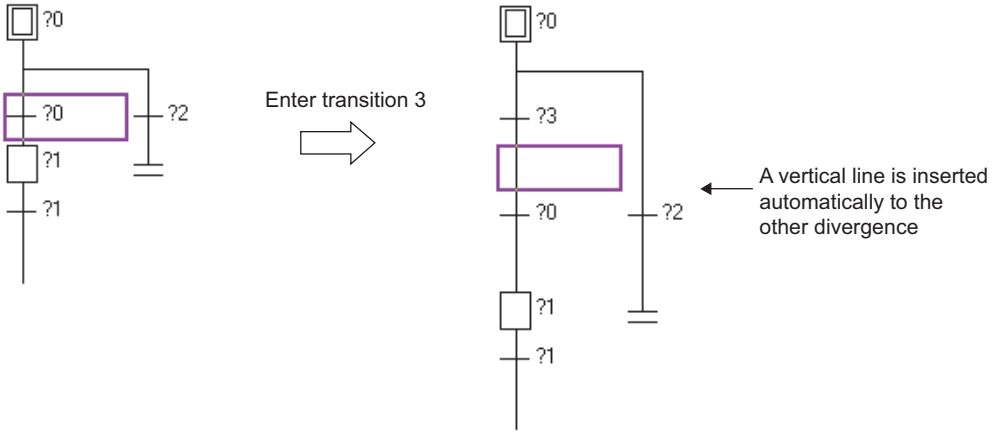
### 4. Click the OK button.

The entered series transition symbol is displayed.

<Overwrite mode>




<Insert mode>



## 7.3.4 Entering selection divergences ( )

Q CPU L CPU FX

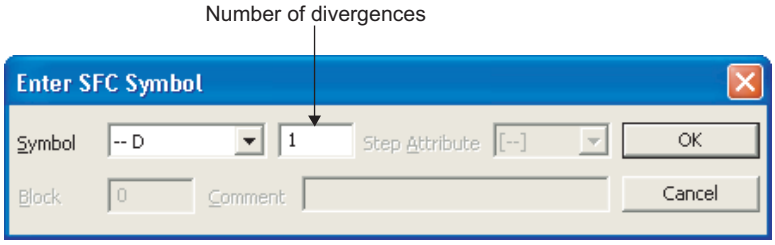
Enter a selection divergence.

### Operating procedure

1. **Move the cursor to the position where a selection divergence is entered.**

2. **Select [Edit] ⇒ [SFC Symbol] ⇒ [Selection Divergence].**

   The Enter SFC Symbol screen or the Enter SFC Symbol/Enter Program screen is displayed in accordance with the display format setting.



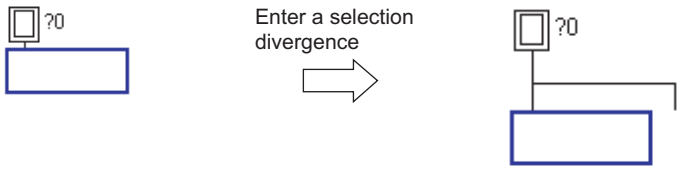

3. **Set the items on the screen.**

| Item | Description |
|---|---|
| Symbol | Select "--D". |
| Number of divergences | Enter a number of columns of divergence line. |
| Step Attribute | (This setting is not required.) |
| Block | (This setting is not required.) |
| Comment | (This setting is not required.) |

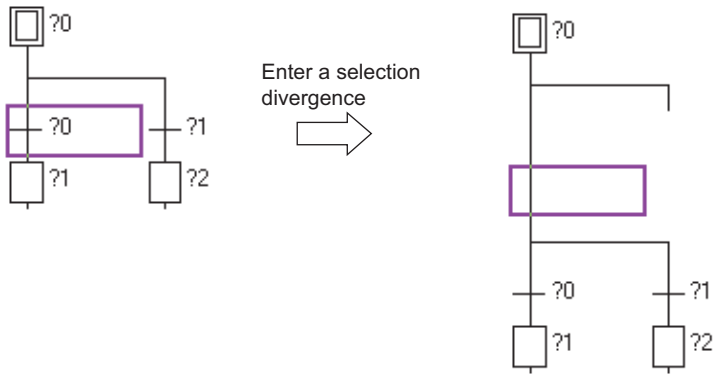
4. **Click the OK button.**

   The entered selection divergence symbol is displayed.

   <Overwrite mode>




   <Insert mode>



## 7.3.5 Entering simultaneous divergences ( )

Q CPU L CPU FX

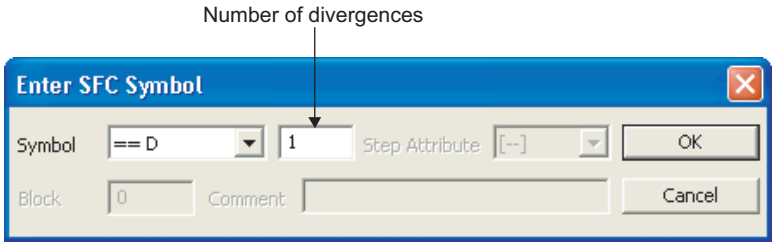
Enter a simultaneous divergence.

### Operating procedure

1. **Move the cursor to the position where a simultaneous divergence is entered.**

2. **Select [Edit] ⇒ [SFC Symbol] ⇒ [Simultaneous Divergence].**

   The Enter SFC Symbol screen or the Enter SFC Symbol/Enter Program screen is displayed in accordance with the display format setting.
   < MELSAP3/FXCPU >

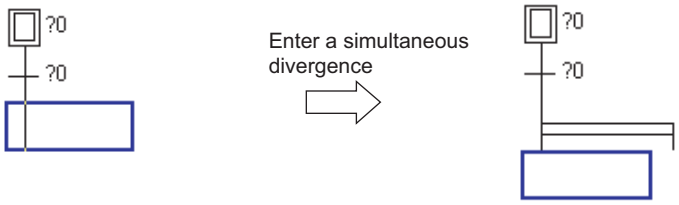



3. **Set the items on the screen.**

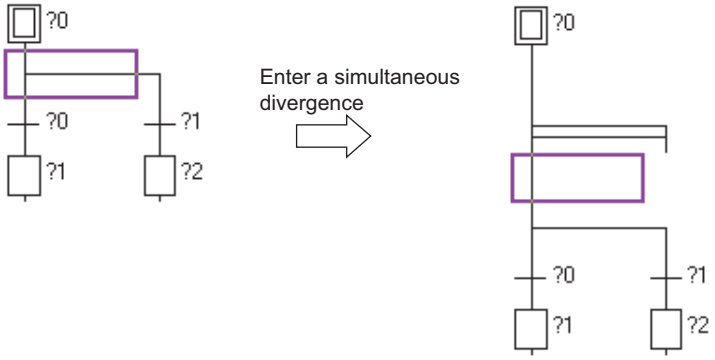
| Item | Description |
|---|---|
| Symbol | Select "==D". |
| Number of divergences | Enter a number of columns of divergence line. |
| Step Attribute | (This setting is not required.) |
| Block | (This setting is not required.) |
| Comment | (This setting is not required.) |

4. **Click the OK button.**

   The entered simultaneous divergence symbol is displayed.
   <Overwrite mode>




   <Insert mode>



## 7.3.6 Entering selection convergences ( )

Q CPU L CPU FX

Enter a selection convergence.

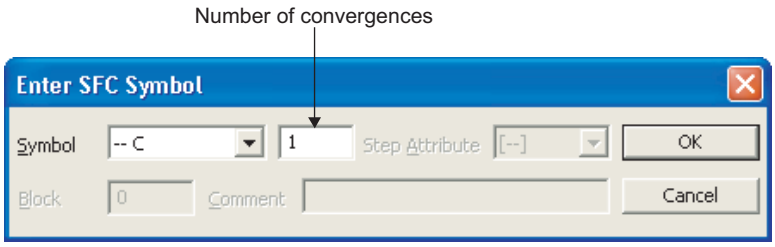
### Operating procedure

1. **Move the cursor to the position where a selection convergence is entered.**

2. **Select [Edit] ⇒ [SFC Symbol] ⇒ [Selection Convergence].**

   The Enter SFC Symbol screen or the Enter SFC Symbol/Enter Program screen is displayed in accordance with the display format setting.

   < MELSAP3/FXCPU >



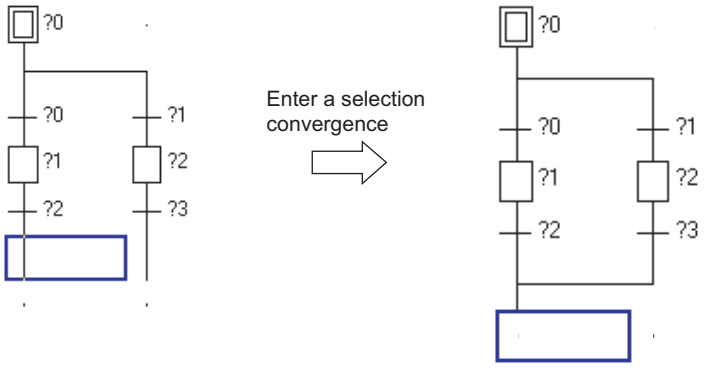

3. **Set the items on the screen.**

| Item | Description |
|---|---|
| Symbol | Select "--C". |
| Number of convergences | Enter a number of columns of convergence line. |
| Step Attribute | (This setting is not required.) |
| Block | (This setting is not required.) |
| Comment | (This setting is not required.) |

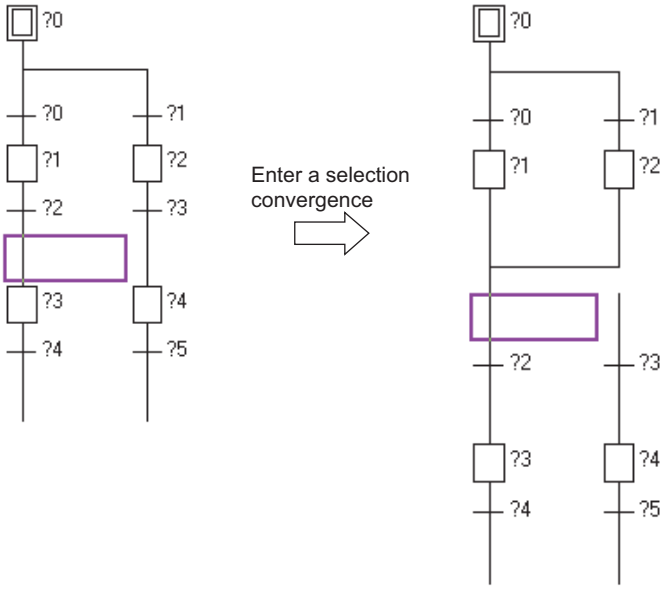
4. **Click the OK button.**

   The entered selection convergence symbol is displayed.

   <Overwrite mode>



<Insert mode>



## 7.3.7 Entering simultaneous convergences ( )

Q CPU L CPU FX

Enter a simultaneous convergence.

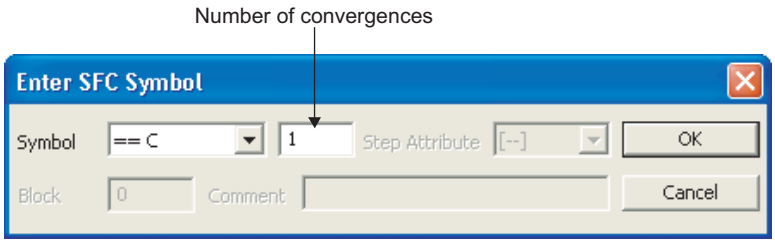
### Operating procedure

1. **Move the cursor to the position where a simultaneous convergence is entered.**

2. **Select [Edit] ⇒ [SFC Symbol] ⇒ [Simultaneous Convergence].**

   The Enter SFC Symbol screen or the Enter SFC Symbol/Enter Program screen is displayed in accordance with the display format setting.

   < MELSAP3/FXCPU >



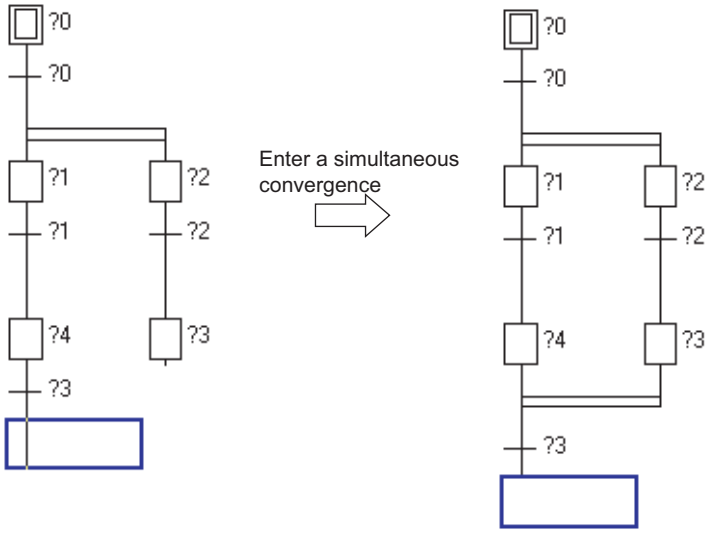

3. **Set the items on the screen.**

| Item | Description |
|---|---|
| Symbol | Select "==C". |
| Number of convergences | Enter a number of columns of convergence line. |
| Step Attribute | (This setting is not required.) |
| Block | (This setting is not required.) |
| Comment | (This setting is not required.) |

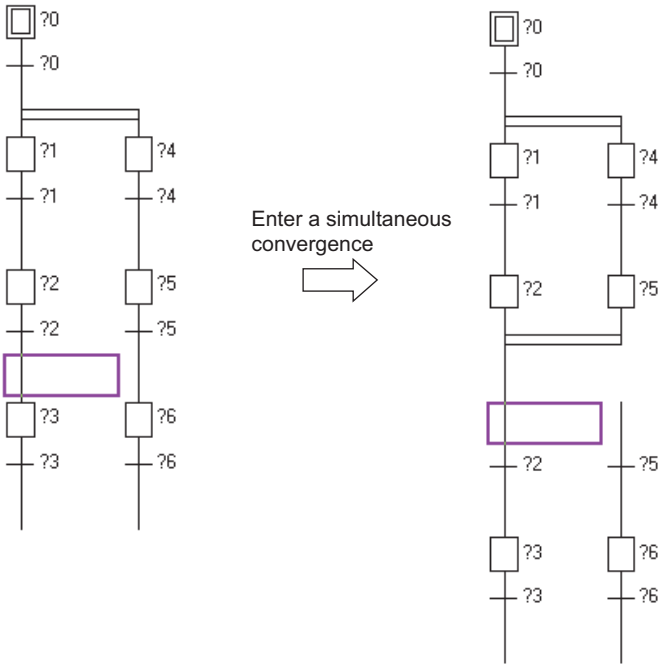
4. **Click the OK button.**

   The entered simultaneous convergence symbol is displayed.

   <Overwrite mode>



<Insert mode>

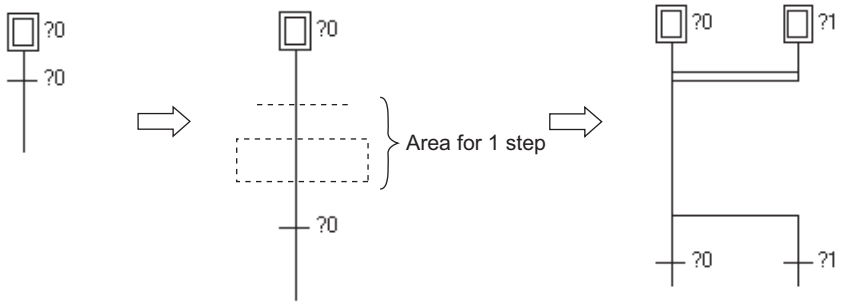

?0
?0
?1
?4
?1
?4
?2
?5
?2
?5
?3
?6
?3
?6
Enter a simultaneous convergence
?0
?0
?1
?4
?1
?4
?2
?5
?2
?5
?3
?6
?3
?6

**Point**

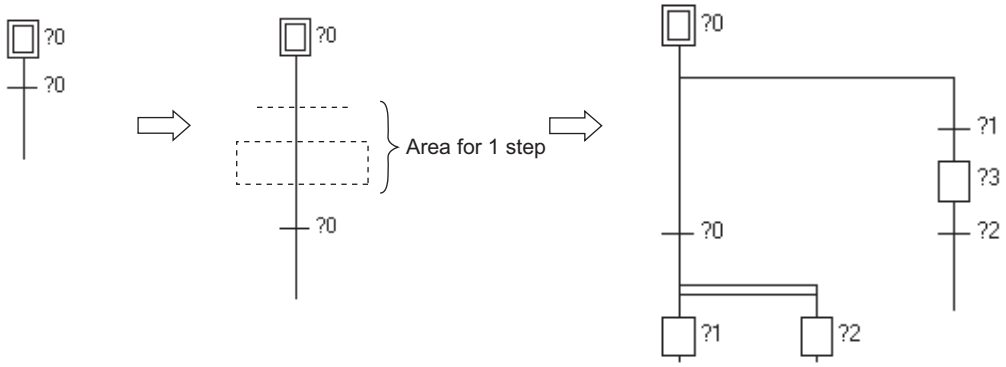
● **Entering method when a divergence and a convergence overlap in a single transition**

Reserve the area for one step using " | " (vertical line), then enter a divergence or convergence symbol. A vertical line can be inserted by selecting [Edit] ⇒ [Insert Row]. (☞ Section 7.3.11 Inserting/deleting rows and columns)

Example 1




Example 2



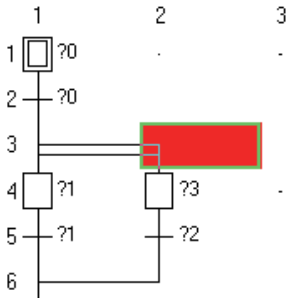

● **Number of divergences/convergences when entering divergence/convergence lines**

By entering '-n' for the number of divergences/convergences, divergence/convergence lines can be created from right to left without changing the cursor position.

● **Inserting divergences/convergences**

Inserting divergences/convergences may cause the SFC diagram to become a program that cannot be converted because of the combination of divergence and convergence. Edit the SFC diagram to be normal and convert the program.

The following SFC diagram cannot be converted because of the combination of simultaneous divergence and selection convergence.



## 7.3.8 Entering jump transitions (↳)

Q CPU L CPU FX

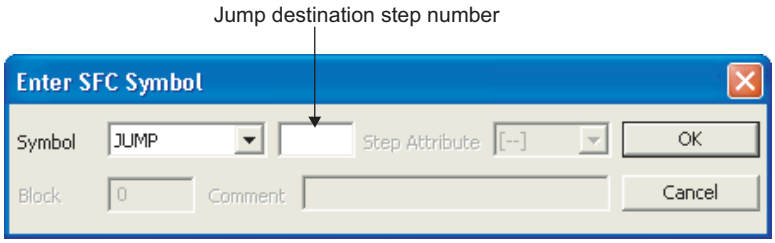
Enter a jump transition.

### Operating procedure

1. **Move the cursor to the position where a jump transition is entered.**

2. **Select [Edit] ⇒ [SFC Symbol] ⇒ [Jump].**

   The Enter SFC Symbol screen or the Enter SFC Symbol/Enter Program screen is displayed in accordance with the display format setting.
   < MELSAP3/FXCPU >

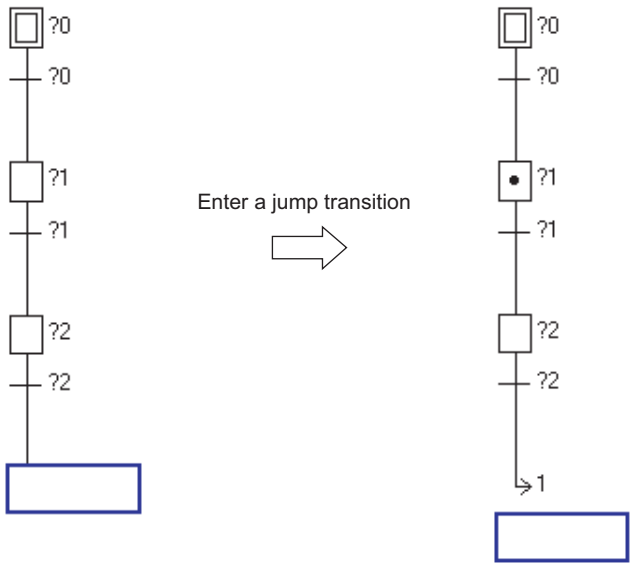



3. **Set the items on the screen.**

| Item | Description |
|---|---|
| Symbol | Select "JUMP". |
| Jump destination step number | Enter a jump destination step number. |
| Step Attribute | (This setting is not required.) |
| Block | (This setting is not required.) |
| Comment | (This setting is not required.) |

4. **Click the OK button.**

   The entered jump transition symbol is displayed.



## 7.3.9 Entering end steps ( )

Q CPU L CPU FX

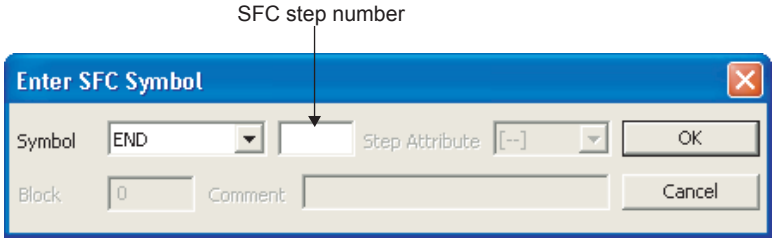
Enter an end step.
For FXCPU, setting of RET or END is not necessary since it is written automatically at the program entry (conversion).

### Operating procedure

1. **Move the cursor to the position where an end step is entered.**

2. **Select [Edit] ⇒ [SFC Symbol] ⇒ [END Step].**

   The Enter SFC Symbol screen or the Enter SFC Symbol/Enter Program screen is displayed in accordance with the display format setting.
   < MELSAP3 >

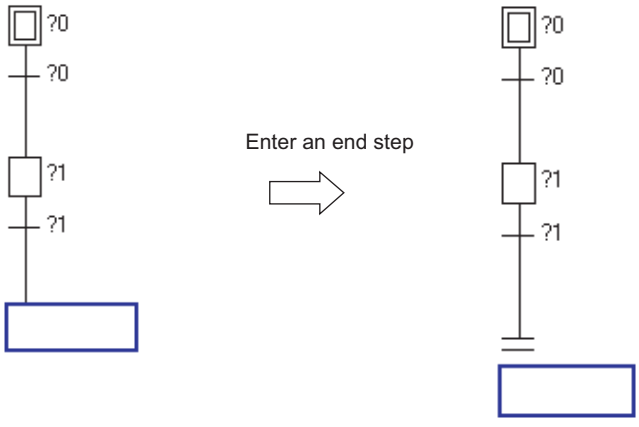



3. **Set the items on the screen.**

| Item | Description |
|---|---|
| Symbol | Select "END". |
| SFC step number | (This setting is not required.) |
| Step Attribute | (This setting is not required.) |
| Block | (This setting is not required.) |
| Comment | (This setting is not required.) |

4. **Click the OK button.**

   The entered end step symbol is displayed.



## 7.3.10 Drawing lines

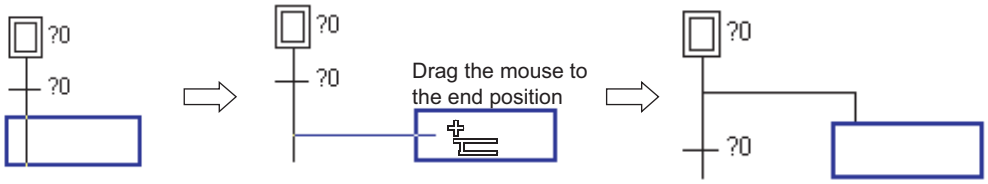
Q CPU L CPU FX

Draw a divergence line and a convergence line by dragging the mouse.

### Operating procedure

1. **Select [Edit] ⇒ [Edit Line] ⇒ [Vertical Line Segment]/[Selection Divergence]/ [Simultaneous Divergence]/[Selection Convergence]/[Simultaneous Convergence].**

2. **Drag the cursor from the start position for entering lines to the end position.**




**Point**

- **Overwriting lines**
  Even when lines are overwritten to the created SFC steps/transitions, SFC steps/transitions and sequence programs in the operation outputs/transition conditions are not deleted.

## 7.3.11 Inserting/deleting rows and columns

Q CPU L CPU FX

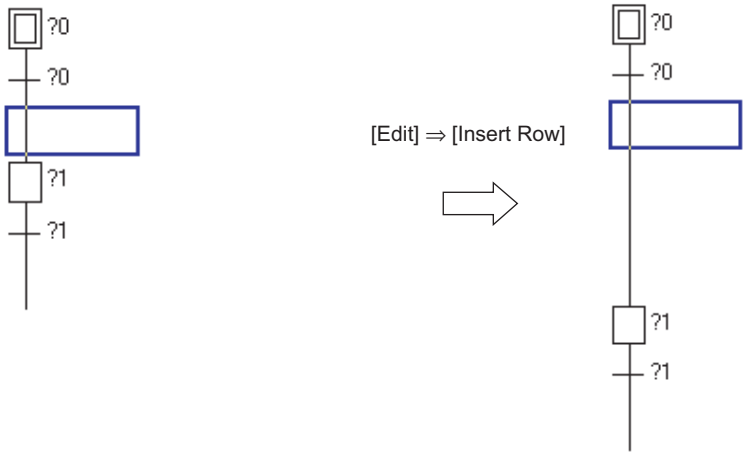
Insert/delete a row and a column.

### Operating procedure

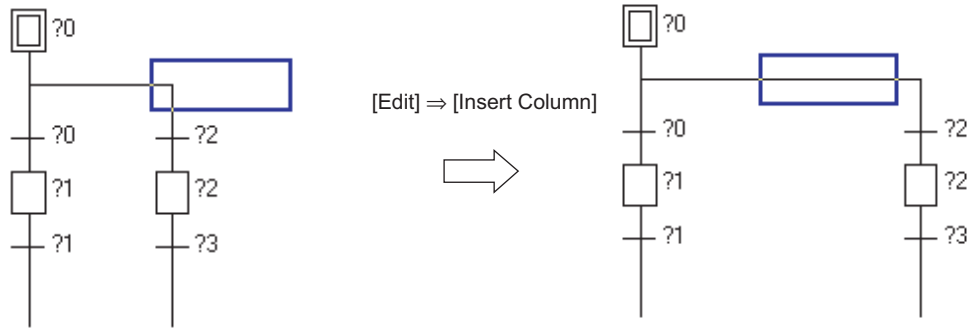
1. **Move the cursor to the position where a row or column is inserted/deleted.**

2. **Execute each operation as shown below.**

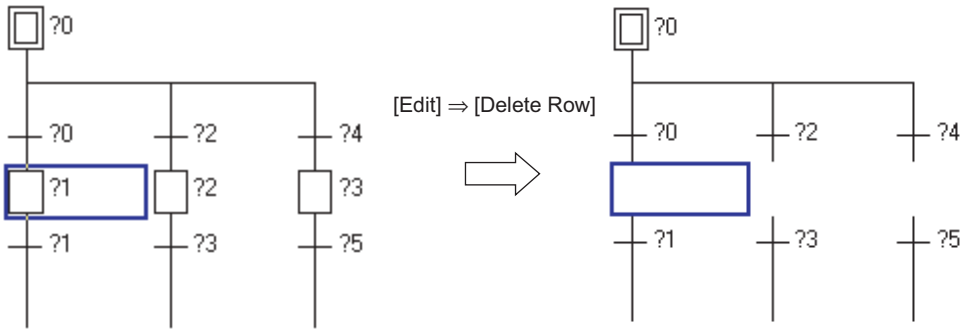
<Inserting a row>



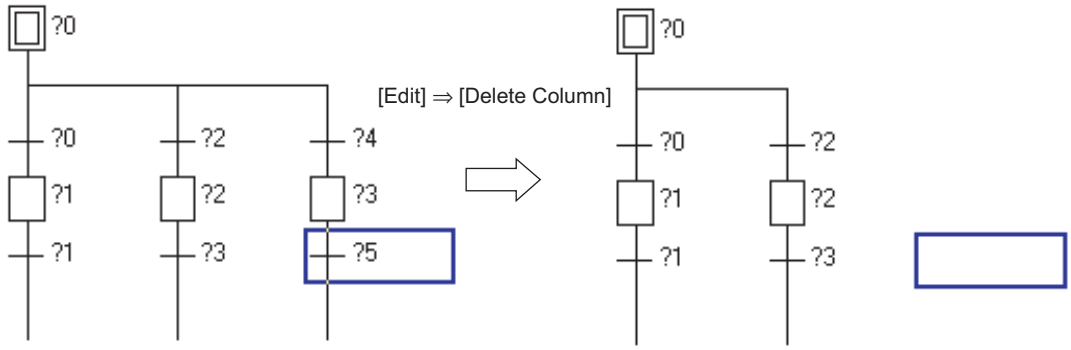

<Inserting a column>



<Deleting a row>




<Deleting a column>



# 7.4 Deleting SFC Diagrams

Q CPU L CPU FX

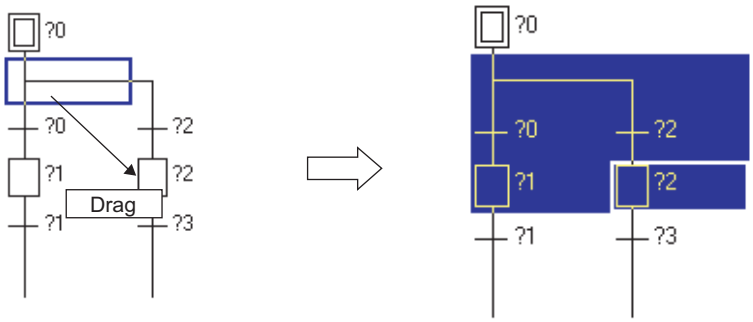
This section explains how to delete entered SFC symbols.

## 7.4.1 Deleting SFC symbols by setting a range

Delete SFC symbols by setting a range.

### Operating procedure

1. **Specify the range to be deleted by dragging the cursor.**




2. **Select [Edit] ⇒ [Delete].**

**Point**

- **Selecting a range**
  The range can be selected by pressing the Shift key + ↑ / ↓ / ← / → keys.
- **Deleting symbols**
  Symbols can be deleted by pressing the Delete key, or by selecting [Edit] ⇒ [Cut].
- **Canceling the previous operation**
  After deleting symbols, the editing status before the deletion is restored by selecting [Edit] ⇒ [Undo].

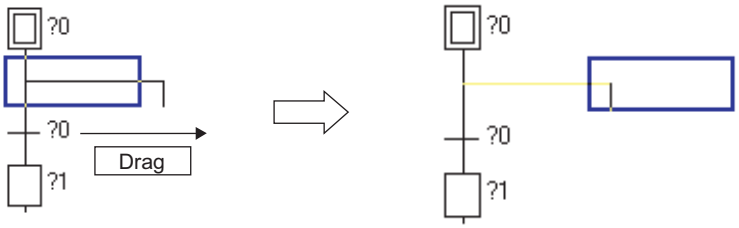
## 7.4.2 Deleting only divergence/convergence/vertical lines

Delete a divergence/convergence/vertical line.

### Operating procedure

1. **Select [Edit] ⇒ [Delete Line].**

2. **Specify the range to be deleted by dragging the cursor.**
   After dragging, the lines in the specified range are deleted.



# 7.5 Changing SFC Step Attributes

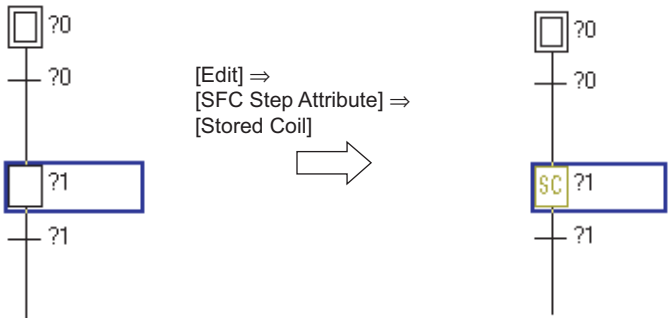
Q CPU L CPU FX

This section explains how to change the SFC step attribute.

## Operating procedure

1. **Move the cursor to the SFC step whose attribute is to be changed.**

2. **Select [Edit] ⇒ [SFC Step Attribute] ⇒ [No Attribute]/[Stored Coil]/[Stored Operation (without Transition Check)]/[Stored Operation (with Transition Check)]/[Reset].**




**Point**

- **Operation output sequence program after the SFC step attribute is changed**
  Even when the SFC step attribute is changed, the operation output sequence program already created remains as it is.

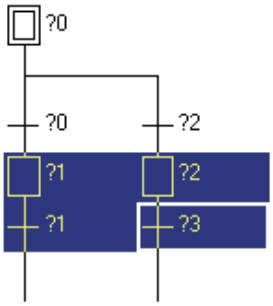
# 7.6 Cutting, copying, and pasting SFC diagrams

Q CPU L CPU FX

This section explains how to cut, copy, and paste the SFC diagram.

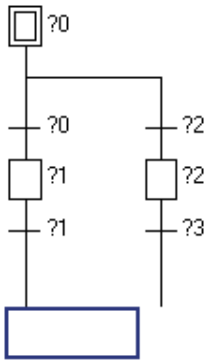
## Operating procedure

1. **Specify the range to be cut or copied.**



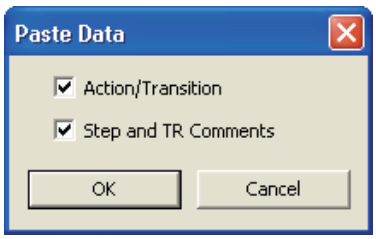

2. **Select [Edit] ⇒ [Cut]/[Copy], and cut or copy the SFC diagram in the specified range.**

3. **Move the cursor to the position where the cut/copied SFC diagram is pasted.**




4. **Select [Edit] ⇒ [Paste].**

The Paste Data screen is displayed.

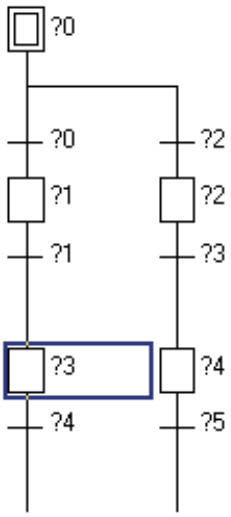


### 5. Set the items on the screen.

| Item | Description |
|---|---|
| Action/Transition | Check this to paste the cut/copied data including operation output/transition condition sequence programs. |
| Step and TR Comments | Check this to paste the cut/copied data including SFC step/transition comments. |

### 6. Click the OK button.

The cut/copied SFC diagram is pasted.
Note that the conversion error occurs when the divergence or convergence line is not correct after pasting data. Edit the SFC diagram and convert the program again.




**Point**

- **Pasting position**
  If the start position of the cut/copied SFC diagram is a SFC step, it cannot be pasted at the position of transition, and if the start position is a transition, it cannot be pasted at the position of SFC step. Change the pasting position one row up or down, and paste the data again.
- **Operation output/transition condition programs to be pasted**
  Paste operation output/transition condition programs within approximate 2k steps.
  For details of maximum number of sequence steps that can be created, refer to the following manual.
  ☞ MELSEC-Q/L/QnA Programming Manual (SFC)

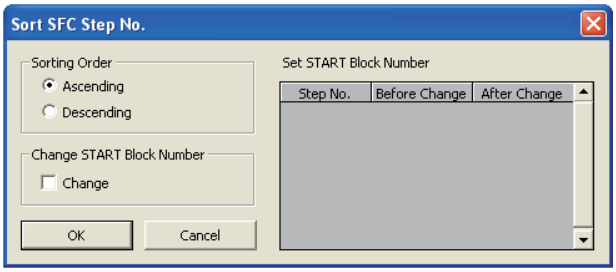
# 7.7 Sorting SFC Step/Transition Numbers of SFC Diagram

Q CPU L CPU FX

This section explains how to sort SFC step/transition numbers of created SFC diagram.

## Screen display

Select [Edit] ⇒ [Sort SFC Step No.].




## Operating procedure

### 1. Set the items on the screen.

| Item | Description |
|---|---|
| Sorting Order | Select whether to sort SFC step/transition numbers in ascending or descending order. |
| Change START Block Number | Check this to change the start block number. |
| Set START Block Number | When the "Change" is selected, set the start destination block number of the block start step that is changed when sorting SFC step/transition numbers. |

### 2. Click the OK button.

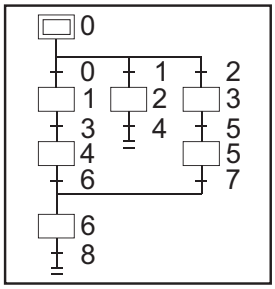
The sorting of SFC step/transition numbers is executed according to the set content.

## Point

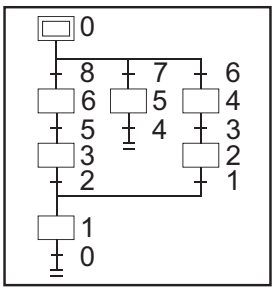
● **Difference of sorting result according to the sort order**

The following figures show the sorting results in ascending and descending order.

(Ascending order)




(Descending order)




- The "Undo" operation can be performed only once immediately after the sort execution.
- The initial step is always set to '0' for either ascending or descending order.

● **SFC devices at the sorting operation**

SFC devices used for operation outputs/transition conditions (such as BLm\Sn, BLm\TRn) are not sorted. Change them using the device replacing function.

# 7.8 Redisplaying SFC Diagrams

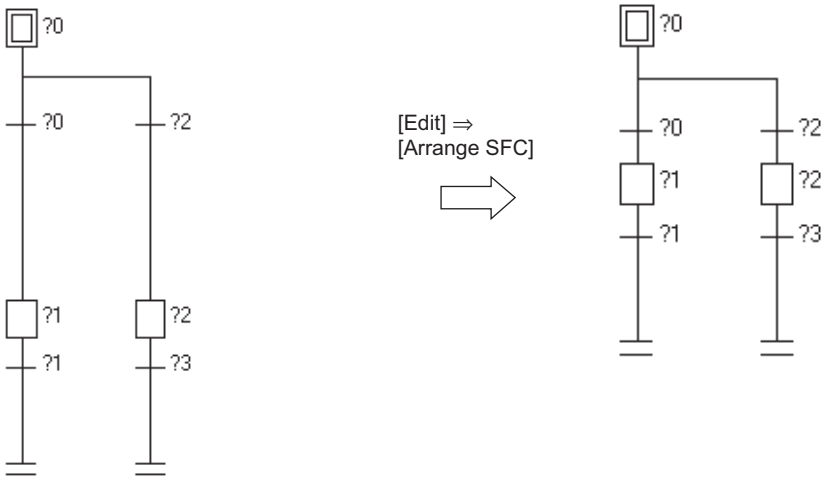
Q CPU L CPU FX

This section explains how to delete unused vertical/divergence/convergence lines in the converted SFC diagram.
If the unconverted SFC diagram is redisplayed, the unconverted SFC diagram is discarded and the latest converted status is restored.

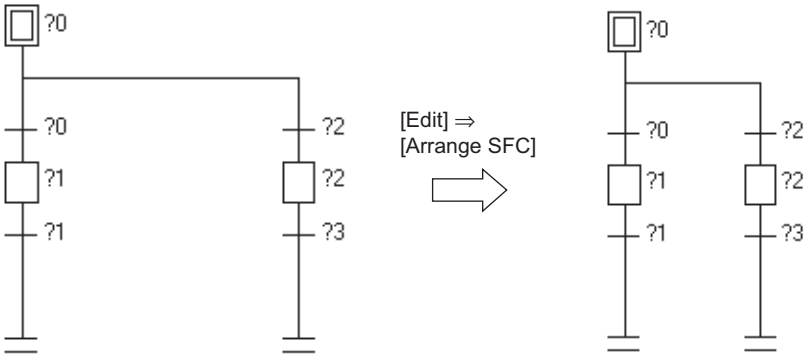
## Operating procedure

- Select [Edit] ⇒ [Arrange SFC].

<Deleting a row section>




<Deleting a column section>



# 7.9 Creating Operation Outputs and Transition Conditions

Q CPU L CPU FX

This section explains how to create operation output and transition condition programs.
Create operation output and transition condition programs on the Zoom editor window when editing in MELSAP3/FXCPU.
Create operation output and transition condition programs on the Enter SFC symbol/Enter Program screen when editing in MELSAP-L.

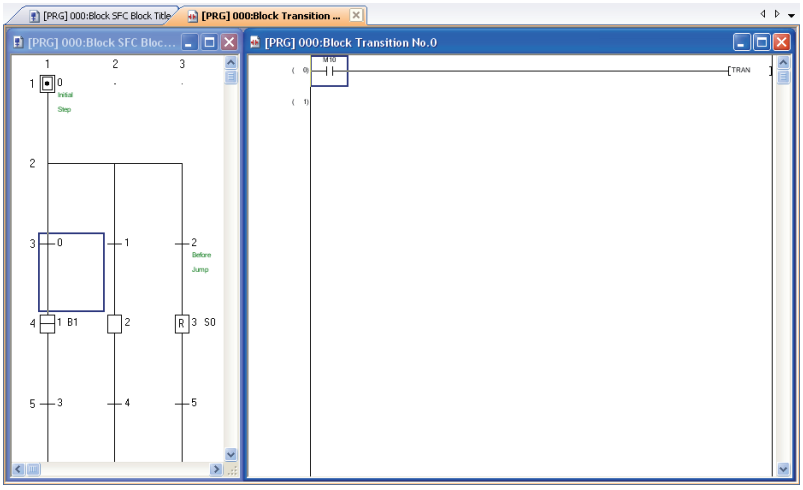
## 7.9.1 Creating operation output and transition condition programs (MELSAP3/FXCPU)

Create operation output and transition condition programs in MELSAP3/FXCPU.

### Operating procedure

1. **Move the cursor to the SFC step/transition where the program is created.**

2. **Move the cursor to the Zoom editor window.**
   The editing operations on the Zoom editor window are the same as those of ladder editor. (☞ Chapter 6)



**Point**

- **Displaying SFC editor window and Zoom editor window**
  By the following setting, the Zoom editor window can be automatically displayed side by side when the SFC editor window is opened. The display of SFC editor and Zoom editor can be selected from Tiling Horizontally or Tiling Vertically.
  Select [Tool] ⇒ [Options] ⇒ "Program Editor" ⇒ "SFC" ⇒ "SFC Diagram" ⇒ "Tile SFC and Zoom vertically".
  When this setting is valid, the setting of "Open Zoom with New Window" is invalidated
- **Moving a cursor of the SFC editor window on the Zoom editor window**
  With the activated Zoom editor window, a cursor of the SFC editor window can be moved.
  Select the direction to move a cursor by selecting [View] ⇒ [Move SFC Cursor] ⇒ [Up] / [Down] / [Left] / [Right] ( Shift + Alt + ↑ / ↓ / ← / → ).
  When the cursor of the SFC editor window is moved, the cursor of the Zoom editor window moves to the corresponding position.
- **Opening the Zoom**
  If "Tile SFC and Zoom vertically" is not selected in the option setting, the Zoom editor window can be opened by selecting [View] ⇒ [Open Zoom/Start Destination Block].
  To open the Zoom, hold the Ctrl key and double-click the corresponding SFC step/transition of the SFC diagram, or press the Ctrl and L keys.
  To return to the SFC diagram from the Zoom editor window, press the Ctrl and R keys.
- **Instructions that can be used in the Zoom editor window**
  For details of unavailable instructions for operation outputs/transition conditions, refer to the following manual.
  ☞ MELSEC-Q/L/QnA Programming Manual (SFC)
  Statements and pointers cannot be entered. For transition conditions, notes cannot be entered as well.
- **Entering a dummy coil to transition conditions**
  Only one dummy coil ( -[TRAN]- ) for the coil instruction can be entered.
  To enter a dummy coil, select [Edit] ⇒ [Ladder Symbol] ⇒ [Coil], and clicking the OK button enters a dummy coil automatically.
- **When the cursor is placed at the block start step**
  If [View] ⇒ [Open Zoom/Start Destination Block] is selected when the cursor is placed at the block start step, the SFC diagram of the start destination block is displayed.
- **Using function blocks in the Zoom editor window**
  Only function blocks created in the ladder language can be used for operation outputs. Function blocks cannot be used for transition conditions.
- **Cutting/copying/pasting data**
  Data can be cut, copied, and pasted between the ladder program and the program in the Zoom editor window. However, data containing instructions, statements, and pointers that cannot be used in the Zoom editor window cannot be pasted. The ladder containing TRAN can be pasted to transition conditions only.

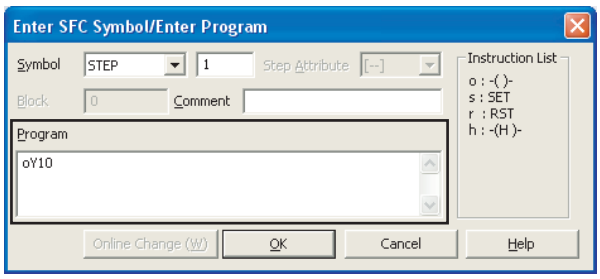
## 7.9.2 Creating operation output and transition condition programs (MELSAP-L (instruction format))

Create operation output and transition condition programs in MELSAP-L (instruction format).

For details of MELSAP-L (instruction format), refer to the following manual.
☞ MELSEC-Q/L Programming Manual (MELSAP-L)

### Screen display

**Select [Edit] ⇒ [SFC Symbol] ⇒ [Step]/[Dummy]/[Transition].**




### Operating procedure

1. **Set the items on the screen.**

| Item | Description |
|---|---|
| Program | Enter an operation output or transition condition program. |

2. **Click the [OK] button.**

### Screen button

- Online Change (W)

  Executes the Online program change on the changed program.

- Help

  Displays the Instruction Help screen. (☞ Section 6.2.2)

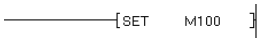
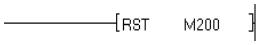
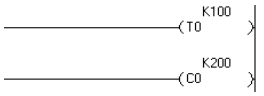
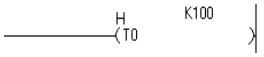
### Point

- **Online program change after compiling all programs**
  The Online program change cannot be performed after compiling all programs.
  Switch the programmable controller CPU to STOP, and perform [Online] ⇒ [Write to PLC].
  For precautions when compiling all programs, refer to Section 10.3.3.

## ■ Operation output programs in MELSAP-L (instruction format)

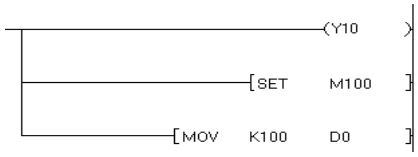
● Operation output instructions

Operation output instructions are described in the following formats.
Both uppercase and lowercase letters can be used.

| Instruction | Format | MELSAP-L description example | Ladder example |
|---|---|---|---|
| Coil output | o□□□ | oY70 |  |
| Set output | s□□□ | sM100 |  |
| Reset output | r□□□ | rM200 |  |
| Timer<br>Counter | o□□□ K** | oT0 K100<br>oC0 K200 |  |
| High-speed timer | h□□□ K** | hT0 K100 |  |
| Instructions other than above | Same as list format | MOV K100 D0 |  |

□□□: Indicates a device
**: Indicates a value

• Delimit with "," to write multiple operation outputs in parallel within the same step.

| MELSAP-L description example | Ladder example |
|---|---|
| oY10, sM100, MOV K100 D0 |  |

● Instructions which cannot be used in operation output programs

The following are the instructions which cannot be entered to operation output programs in MELSAP-L.

- NOP
- MPS, MRD, MPP
- Contact instructions
- Comparison operation instructions (such as =, <, >)

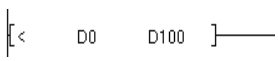
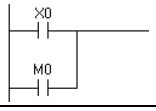
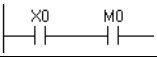
● Precautions when writing operation output programs

- Write instructions which do not require an execution condition (such as DI, EI) at the last of each operation output program.
  Example) oY70, MOV D0 D100, DI
- Up to 24 instructions can be written to a single operation output program.

## ■ Transition condition programs in MELSAP-L (instruction format)

● Transition condition instructions

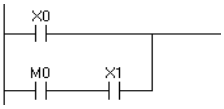
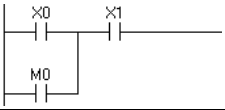
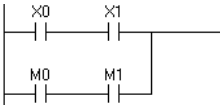
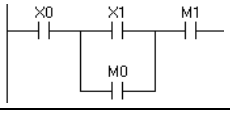
Transition condition instructions are described in the following formats.
Both uppercase and lowercase letters can be used.

| Instructions | Format | MELSAP-L description example | Ladder example |
|---|---|---|---|
| Open contact | a□□□ | aX0 |   |
| Closed contact | b□□□ | bX10 |   |
| Rising pulse | p□□□ | pM100 |   |
| Falling pulse | f□□□ | fM200 |   |
| Contact-equivalent instruction | Same as list format | < D0 D100 |   |
| OR | □□□ \| □□□ | aX0 \| aM0 |   |
| AND | □□□ & □□□ | aX0 & aM0 |   |

□□□: Indicates a device

● OR and AND instructions

When the OR and AND instructions are combined, the AND instruction is given the priority.
Use "( )" to give the higher priority.

| MELSAP-L description example | Ladder example |
|---|---|
| aX0 \| aM0 & aX1 |   |
| (aX0 \| aM0) & aX1 |   |
| aX0 & aX1 \| aM0 & aM1 |   |
| aX0 & (aX1 \| aM0) & aM1 |   |

● Instructions which cannot be used in transition condition programs

The following are the instructions which cannot be entered to transition condition programs in MELSAP-L.

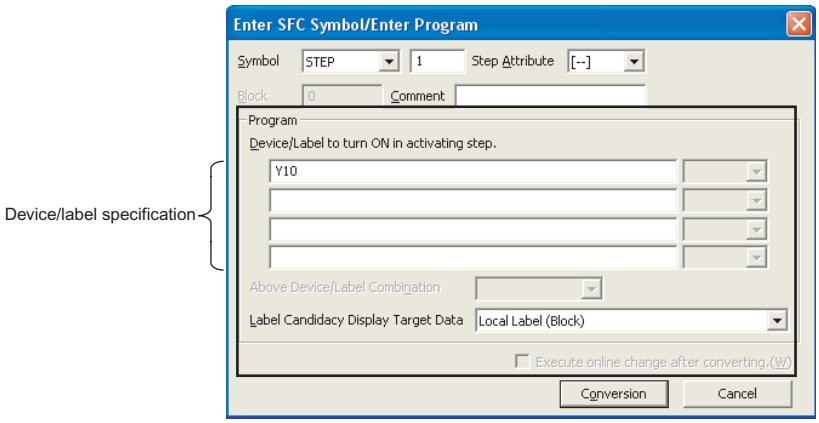
- Instructions other than the contact instructions and comparison operation instructions

## 7.9.3 Creating operation output and transition condition programs (MELSAP-L (start conditions format))

Create operation output and transition condition programs in MELSAP-L (start conditions format).

### Screen display

**Select [Edit] ⇒ [SFC Symbol] ⇒ [Step]/[Dummy]/[Transition].**




### Operating procedure

1. **Set the items on the screen.**

| Item | | Description |
|---|---|---|
| Program | | Enter items for an operation output or transition condition program. |
| | Device/label specification | • Operation output<br>Enter devices/labels.<br>• Transition condition<br>Set devices/labels and ON/OFF. |
| | Above Device/Label Combination | Select AND or OR for each condition. |
| | Label Candidacy Display Target Data | Select the corresponding data of label options displayed for device/label specification. |
| Execute online change after converting.*1 | | Select this to execute the Online program change on the changed program. |

*1: This item cannot be selected after compiling all programs. For details, refer to the Point in this section. For precautions when compiling all programs, refer to Section 10.3.3.

2. **Click the Conversion button.**

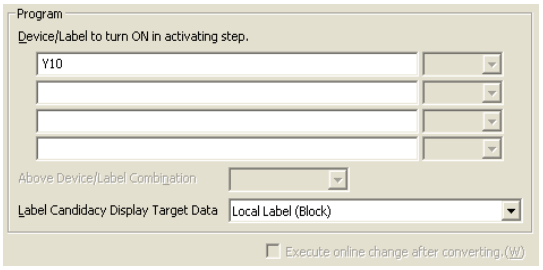
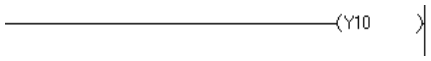
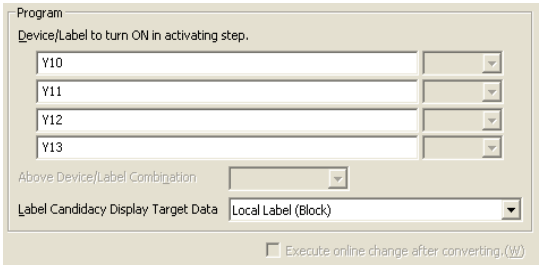
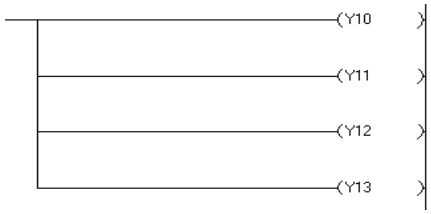
The program is converted and reflected to the SFC diagram.

**Point**

● **"Execute online change after converting" check box**
When the check box of "Execute online change after converting" is disabled after compiling all programs, select [Online] ⇒ [Write to PLC] and write programs to the programmable controller CPU to validate the check box.

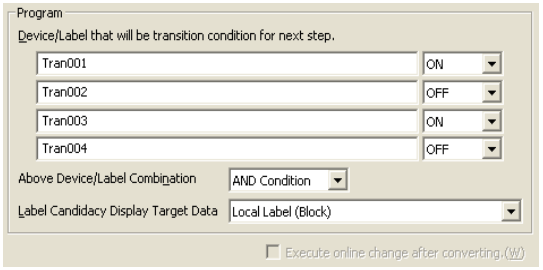
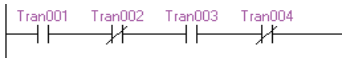
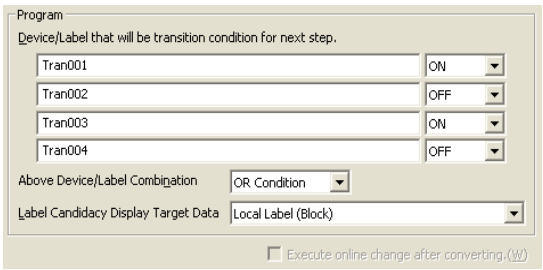
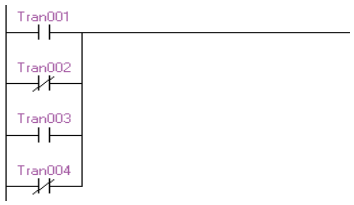
## ■ Operation output programs in MELSAP-L (start conditions format)

The following are the setting examples of operation output program.

| MELSAP-L description example | Ladder example |
|---|---|
|  |  |
|  |  |

## ■ Transition condition programs in MELSAP-L (start conditions format)

The following are the setting examples of transition condition program.

| MELSAP-L description example | Ladder example |
|---|---|
|  |  |
|  |  |

# 7.10 Setting Block Information

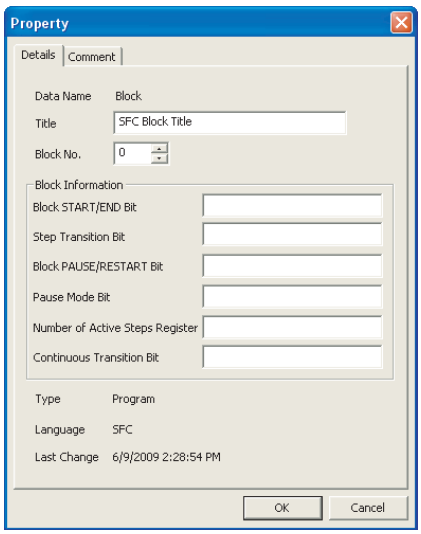
Q CPU L CPU FX

This section explains how to set block information.
Block information is set on the Property screen of SFC block.
Select the SFC block to be set in the Project view in advance.

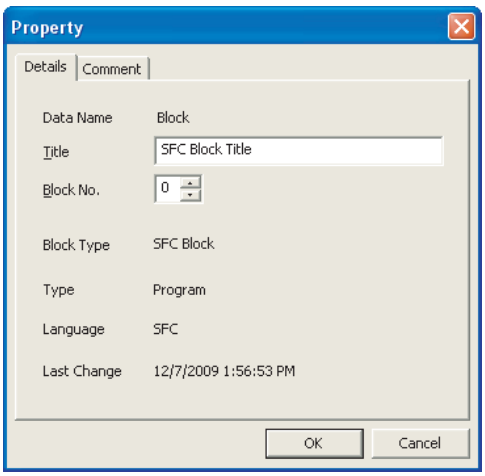
## Screen display

Select [Project] ⇒ [Object] ⇒ [Property] ⇒ <<Details>>.

< QCPU (Q mode)/LCPU>




< FXCPU >




## Operating procedure

- Set the items related to the block information on the screen.

| Item | Description |
|---|---|
| Title | Enter the title of the SFC block. (The number of applicable characters is 32.) |
| Block No. | Specify the SFC block number. (0 to 319. Note that 0 to 127 for Q02UCPU, and 0 to 24 for FXCPU.) |
| Block Information | Enter devices/labels to the required items as block information devices. (The number of applicable characters is 32.) |

### Point

- **Title of SFC block (projects without labels)**
  The set block title is stored as a device comment of device BLm. A block title can be created/changed by entering "BLm" for the device name on the device comment editor. When setting block titles for each program, create comments by program.
  For creating and editing device comments, refer to the following manual.
  ☞ GX Works2 Version 1 Operating Manual (Common)
- **Title of SFC block (projects with labels)**
  When the block title is set, the confirmation message asking whether to copy the block title to the device comment of device BLm is displayed. Creating device comment for the device set as BLm on the device comment editor is not applied to the block title.
- **Block information**
  - For details of functions and operations of each item, refer to the following manual.
    ☞ MELSEC-Q/L/QnA Programming Manual (SFC)
  - When the block information is changed in the project with labels, the program becomes uncompiled status.

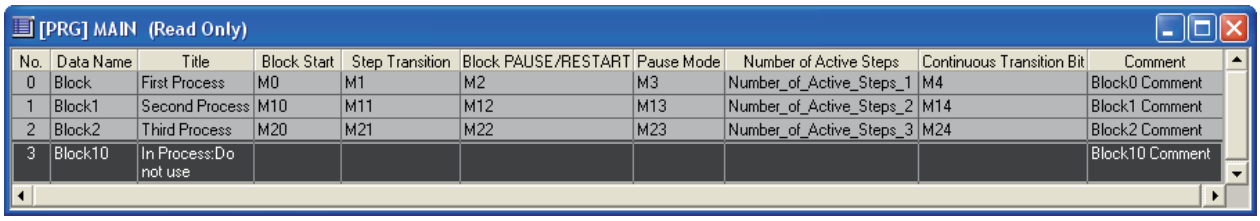
# 7.11 Displaying SFC Block List

This section explains how to display the list of the SFC program block information including the SFC diagram being edited.
Open the screen of the SFC diagram in advance.

## Screen display

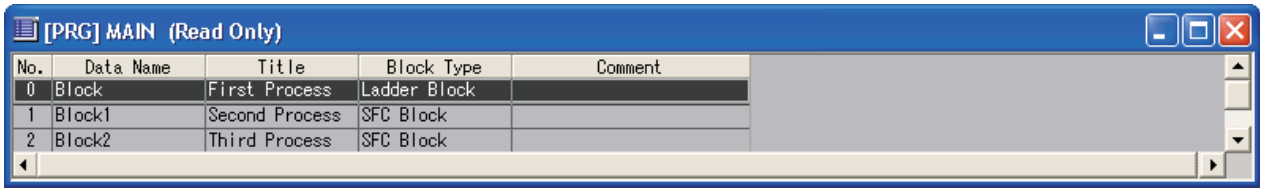
Select [View] ⇒ [Open SFC Blocklist].

< QCPU (Q mode)/LCPU>




| No. | Data Name | Title | Block Start | Step Transition | Block PAUSE/RESTART | Pause Mode | Number of Active Steps | Continuous Transition Bit | Comment |
|---|---|---|---|---|---|---|---|---|---|
| 0 | Block | First Process | M0 | M1 | M2 | M3 | Number_of_Active_Steps_1 | M4 | Block0 Comment |
| 1 | Block1 | Second Process | M10 | M11 | M12 | M13 | Number_of_Active_Steps_2 | M14 | Block1 Comment |
| 2 | Block2 | Third Process | M20 | M21 | M22 | M23 | Number_of_Active_Steps_3 | M24 | Block2 Comment |
| 3 | Block10 | In Process:Do not use | | | | | | | Block10 Comment |

< FXCPU >




| No. | Data Name | Title | Block Type | Comment |
|---|---|---|---|---|
| 0 | Block | First Process | Ladder Block | |
| 1 | Block1 | Second Process | SFC Block | |
| 2 | Block2 | Third Process | SFC Block | |

## Display contents

| Item | Description |
|---|---|
| No. | Display "Block No." set on the Property screen of SFC block. |
| Data Name | Display the block name. |
| Title | Display "Title" set on the Property screen of SFC block. |
| Block Type*1 | Display either "SFC Block" or "Ladder Block". |
| Block Start*2 | Display "Block START/END Bit" set on the Property screen of SFC block. |
| Step Transition*2 | Display "Step Transition Bit" set on the Property screen of SFC block. |
| Block PAUSE/RESTART*2 | Display "Block PAUSE/RESTART Bit" set on the Property screen of SFC block. |
| Pause Mode*2 | Display "Pause Mode Bit" set on the Property screen of SFC block. |
| Number of Active Steps*2 | Display "Number of Active Steps Register" set on the Property screen of SFC block. |
| Continuous Transition Bit*2 | Display "Continuous Transition Bit" set on the Property screen of SFC block. |
| Comment | Display "Comment" set on the Property screen of SFC block. |

*1: Not supported by QCPU (Q mode)/LCPU.

*2: Not supported by FXCPU.

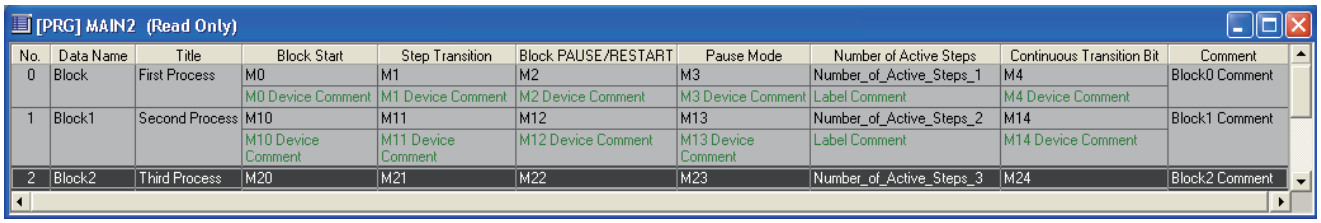
## 7.11.1 Displaying comments on SFC block list

Q CPU L CPU FX

Display device/label comments on the SFC block list.

### Operating procedure

Select [View] ⇒ [SFC Block List Comment].




**Point**

● **Displaying comments on the SFC block list**
Comments also can be displayed on the SFC block list by the following operation.
Select [Tool] ⇒ [Options] ⇒ "Program Editor" ⇒ "SFC" ⇒ "Comment".



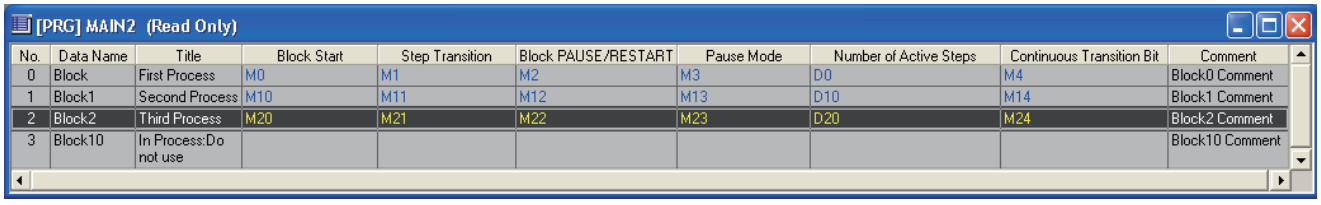

## 7.11.2 Displaying devices on SFC block list

Q CPU L CPU FX

Display devices assigned to labels on the SFC block list.
This function is available after the compilation of the SFC program.

### Operating procedure

Select [View] ⇒ [Address Display].




**Point**

● **When SFC program becomes uncompiled status**
When the SFC program becomes uncompiled status, the device display is disabled.

● **Displayed comments**
When [SFC Block List Comment] is selected, displayed comments are changed from label comments to device comments.

## 7.11.3 Displaying SFC diagram from SFC block list

Q CPU L CPU FX

Display the SFC diagram of the block at the cursor position on the SFC block list.

### Operating procedure

1. **Move the cursor to the block to be displayed.**
2. **Select [View] ⇒ [Open SFC Body], or double-click the block to be displayed.**

## 7.11.4 Displaying Local Label Setting screen from SFC block list

Q CPU L CPU FX

Display the Local Label Setting screen of the block at the cursor position on the SFC block list.

### Operating procedure

1. **Move the cursor to the block to be displayed.**
2. **Select [View] ⇒ [Open Header].**

# 7.12 Setting Parameters for SFC Programs

Q CPU L CPU FX

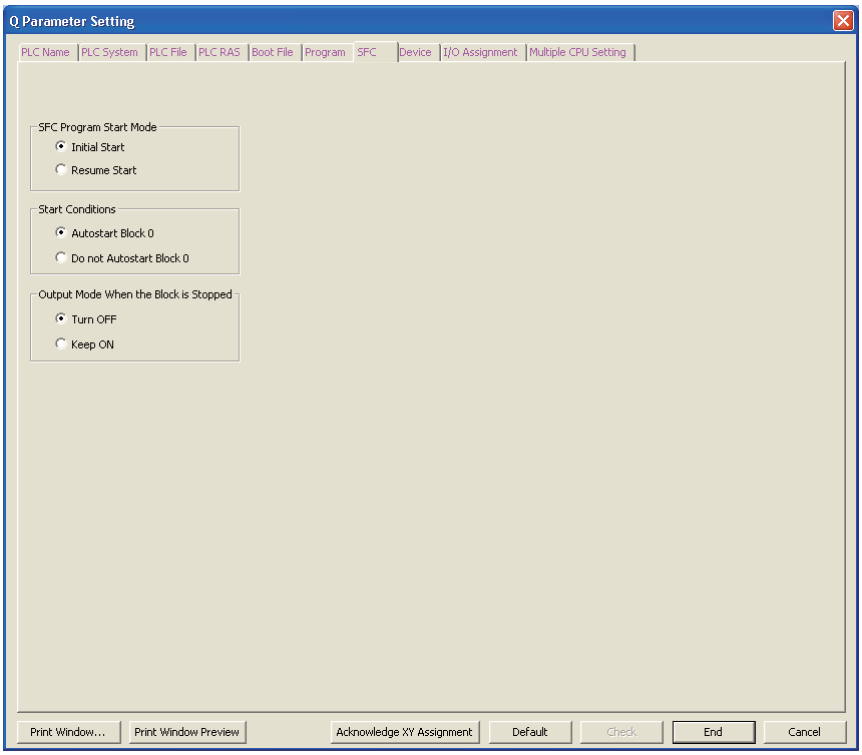
This section explains how to set parameters for SFC programs among the parameter settings for operating the programmable controller CPU.

## 7.12.1 SFC settings in PLC parameter

Set parameters for SFC programs in PLC parameter.

### Screen display

Select Project view ⇒ "Parameter" ⇒ "PLC Parameter" ⇒ <<SFC>>.




### Operating procedure

- Set the items on the screen.

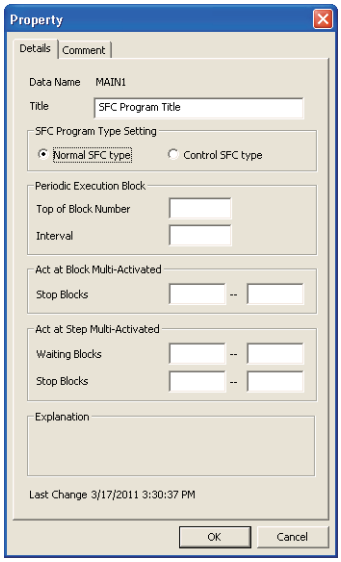
| Item | Description |
|---|---|
| SFC Program Start Mode | Select to initial start or resume start the SFC program. |
| Start Conditions | Select whether to autostart block 0 at the initial start of the SFC program. |
| Output Mode When the Block is Stopped | Select to stop the program by turning OFF the coil outputs that are turned ON by the OUT instruction, or to stop the program while they are remained ON, when the stop operation is requested to each block. |

## 7.12.2 Setting the property of SFC programs

Set the property of SFC programs.

### Screen display

Select [Project] ⇒ [Object] ⇒ [Property].
The following is a screen of High Performance model QCPU.




### Operating procedure

- Set the items on the screen.

| Item | | Description |
|---|---|---|
| <<Details>> | | - |
| | Title | Enter the title of the SFC program. (The number of applicable characters is 32.) |
| | SFC Program Type Setting*1 | Select the "Normal SFC type" or "Control SFC type". |
| | Periodic Execution Block*1 | All blocks following the set block number become periodic execution blocks. To process all blocks in every scan, leave this field blank.<br>The execution interval is entered within the range of 1 to 65535ms in unit of 1ms. |
| | Act at Block Multi-Activated*2 | When the blocks in the specified range is active, and the start operation is requested from another block, an error occurs and the operation of the programmable controller CPU stops.<br>The operating mode at the multiple activation for blocks out of the specified range becomes 'standby'.<br>To set the operating mode to 'standby' for all blocks, leave the start and end fields blank. |
| | Act at Step Multi-Activated*1 | When the multiple activation of SFC steps occurs, the SFC steps in the range specified for the "Waiting Blocks" are set in standby status until the corresponding SFC steps become inactive.<br>When the multiple activation of SFC steps occurs, the SFC steps in the range specified for the "Stop Blocks" become error and the operation of the programmable controller CPU stops.<br>When the multiple activation of SFC steps occurs, the SFC steps out of the specified range are forcibly transited. |
| <<Comment>> | | - |
| | Comment | Enter comments of the SFC program. |
| Explanation | | When the cursor is placed on a setting item, an explanation of the item is displayed. |

*1: Not supported by Basic model QCPU, Universal model QCPU, and LCPU.
*2: Not supported by Basic model QCPU, Q00U, Q00UJ, Q01U, Q02U, and LCPU.

**Point**

- **Applicable range for the set data**
  The data set in the property of SFC program are commonly applied to all blocks in SFC programs. Specific data cannot be set for each block.

- **Control SFC type program**
  An SFC diagram can be created for the block 0 only in the control SFC type program.
  If a block start step is entered to the block 0, an error occurs and the programmable controller CPU stops when the program is executed.

# 7.13 Precautions on Creating Programs in MELSAP-L

Q CPU L CPU FX

The following explains the precautions on creating SFC programs in MELSAP-L.

1) For Simple project, either MELSAP3 or MELSAP-L format can be selected for each project. Note that however, MELSAP3 and MELSAP-L cannot be specified for each block of SFC program. For Structured project, select one format per project.

2) Contact instructions and contact-equivalent instructions cannot be entered to operation output programs.

3) Each operation output/transition condition program is displayed within 32 characters in an SFC diagram. If the program exceeds 32 characters, it is displayed up to 28th character and "..." is displayed after a space.

4) Notes cannot be created.

5) Device comments are not displayed on the SFC diagram. Device comments are edited and displayed on the device comment editor.

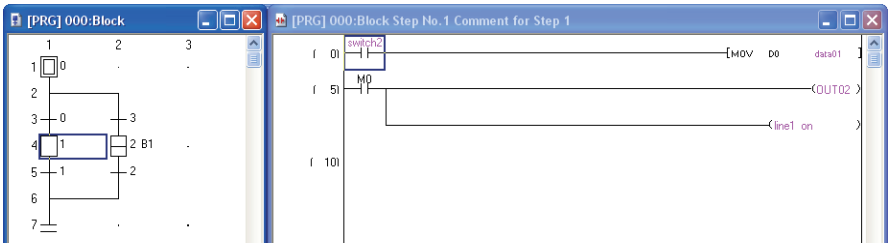
6) SFC programs with different display formats can be verified when a project is verified.

7) When a program created in MELSAP3 is displayed in MELSAP-L, the following operation outputs/ transition conditions are displayed in "?" marks.

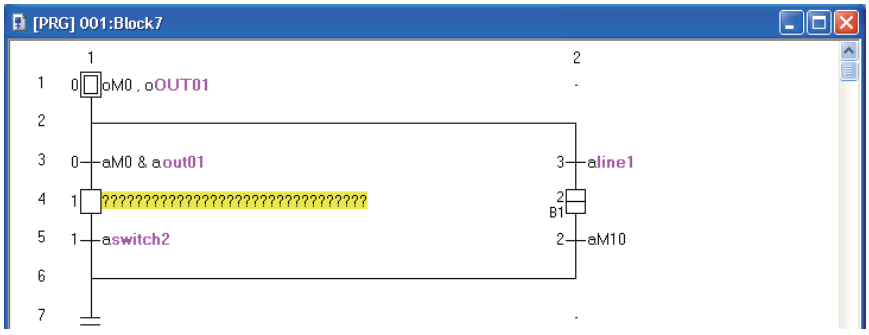
- Operation output/transition condition contains an NOP instruction
- Operation output contains a contact instruction or contact-equivalent instruction
- Operation output contains a note

When "?" marks are displayed, change the format to MELSAP3 and check the ladder.
Programs created in MELSAP3 cannot be modified or monitored in MELSAP-L, however, a CPU processes them normally.
To modify and monitor programs in MELSAP-L after they are checked in MELSAP3, delete programs displayed in "?" marks on the Enter SFC Symbol/Enter Program screen and enter them again in MELSAP-L.

MELSAP3




MELSAP-L



8) When a program created in MELSAP-L (instruction format) is displayed in MELSAP-L (start conditions format), the following operation outputs/transition conditions are displayed in "?" marks.

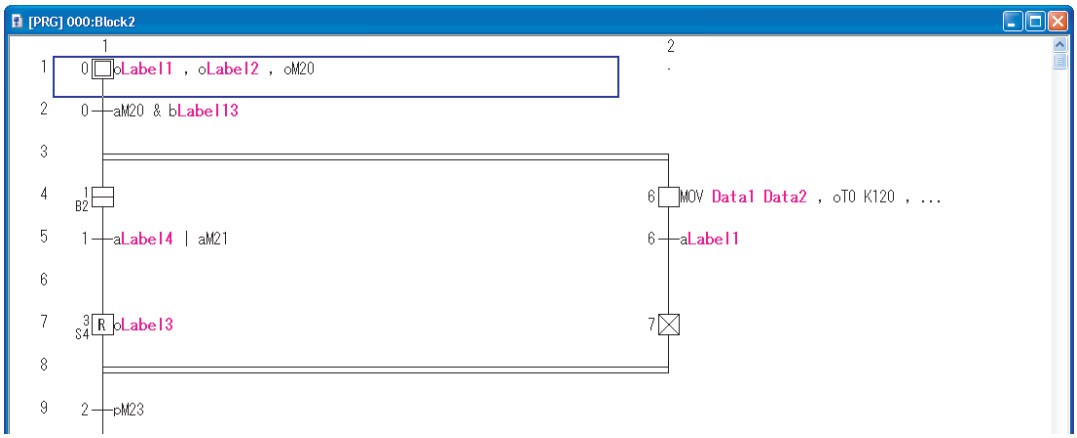
- Operation outputs which include the instructions other than OUT
- Transition conditions which include the instructions other than LD, AND, OR, LDI, ANI, ORI.

When "?" marks are displayed, change the format to MELSAP-L (instruction format), and check the ladder.

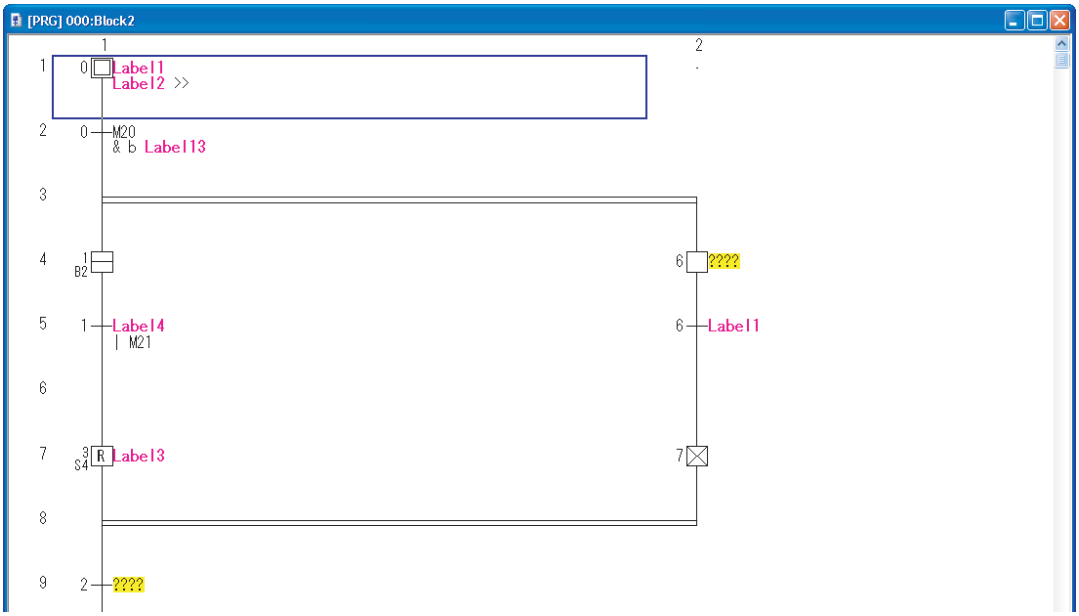
Programs created in MELSAP-L (instruction format) cannot be modified or monitored in MELSAP-L (start conditions format), however, a CPU processes them normally.

To modify and monitor programs in MELSAP-L (start conditions format) after they are checked in MELSAP-L (instruction format), delete programs displayed in "?" marks on the Enter SFC Symbol/ Enter Program screen and enter them again in MELSAP-L (start conditions format).

MELSAP-L (instruction format)




MELSAP-L (start conditions format)



## 7.14 Changing T/C Setting Values

Q CPU L CPU FX

For displaying setting values of timer and counter used in SFC programs and changing them in batch, refer to the following section.

☞ Section 6.15 Changing T/C Setting Values

# 8 SEARCH AND REPLACE

This chapter explains basic operations of search, replace and batch-replace functions.


**8.1 Searching for and Replacing Data in Ladder Programs . . . . 8-2**
**8.2 Searching for and Replacing Data in SFC Programs. . . . . 8-6**

# 8.1 Searching for and Replacing Data in Ladder Programs

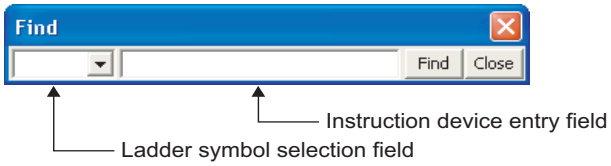
Q CPU L CPU FX

This section explains how to search for and replace the specified device, instruction, and step number.
For the operations of device search/replace, instruction search/replace, and open/closed contact change functions, refer to the following manual.
☞ GX Works2 Version 1 Operating Manual (Common)

## 8.1.1 Searching for devices/labels

Search for a specified device/label.

1. **Press the Space key on the program editor.**
   The Search screen is displayed.




2. **Enter a device/label to be searched.**

| Item | Description |
|---|---|
| Ladder symbol selection field | Specify a ladder symbol. Click ▼ to display the list of ladder symbols. |
| Instruction device entry field | Enter an instruction, a device, or a label. |

3. **Click the Find button.**
   The cursor is moved to the specified device or label.

## 8.1.2 Jumping to the specified step number

Jump to the specified step number.

### Screen display

Select [Find/Replace] ⇒ [Jump].




### Operating procedure

**1. Enter the jump destination step number.**

| Item | Description |
|---|---|
| Step No. | Enter a program step number for the jump destination.<br>Click ▼ to select from the list of ten step numbers entered previously. |

**2. Click the OK button.**

The cursor jumps to the specified step number.

**Point**

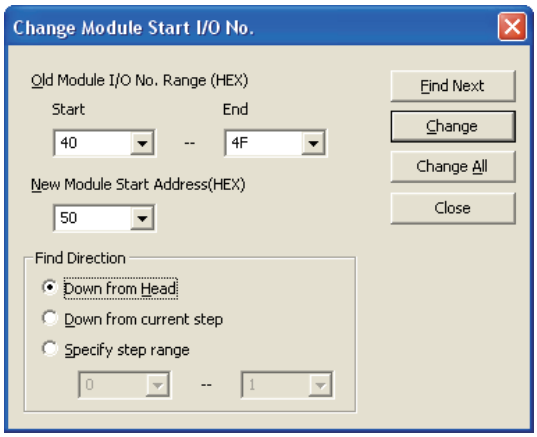
● **Jump function**
On the program editor, pressing a numeric key on the keyboard enables to display the Jump screen.

## 8.1.3 Changing the module start I/O numbers

Change the module start I/O number used for the arguments of the FROM(P), TO(P), DFRO(P), and DTO(P) instructions when a module I/O number is changed by changing the module mounting status. For FXCPU, the FROM(P), TO(P), DFROM(P), and DTO(P) instructions are the target instructions.

### Screen display

Select [Find/Replace] ⇒ [Change Module I/O No.].




For FXCPU, "Old Module I/O No. Range (HEX)" is indicated as "Old Module I/O No. Range (0 - 7)", and "New Module Start Address (HEX)" is indicated as "New Module Start Address (0 - 7)".

### Operating procedure

1. **Set the items on the screen.**

| Item | | Description |
|---|---|---|
| Old Module I/O No. Range (HEX) | Start | Enter a module start I/O number in the range to be changed.<br>Click ▼ to select from the list of ten module I/O numbers entered previously. |
| | End | Enter a last module I/O number in the range to be changed.<br>Click ▼ to select from the list of ten module I/O numbers entered previously. |
| New Module Start Address (HEX) | | Enter a replaced module I/O number that corresponds to the module I/O number entered for the "Start".<br>Click ▼ to select from the list of ten module I/O numbers entered previously. |
| Find Direction | Down from Head | Select this to execute a search in the downward direction from the start of the program regardless of the current step position. |
| | Down from current step | Select this to execute a search in the downward direction from the current step position. |
| | Specify step range | Select this to execute a search in the range set by the entered step numbers. |

2. **Click the** Find Next **button.**

   The cursor moves to the searched old module I/O number.

3. **Click the** Change **or** Change All **button change the I/O number.**

   The old module I/O numbers are replaced with the new module I/O numbers, and the search for the old module I/O numbers continues.

   If the Change All button is clicked, all searched old module I/O numbers are batch replaced with the new module I/O numbers.

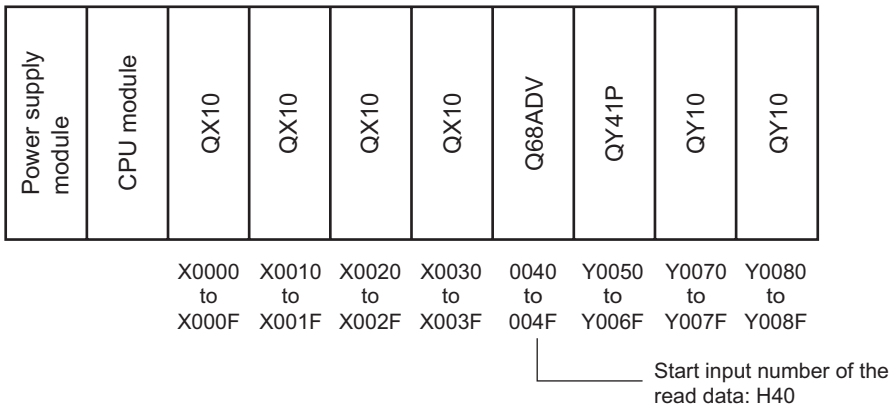
4. **Click the** Close **button to end the batch-replace function.**

## ■ Precautions on replacing module start I/O numbers (QCPU (Q mode)/LCPU)

The following explains the precautions on replacing module start I/O numbers.

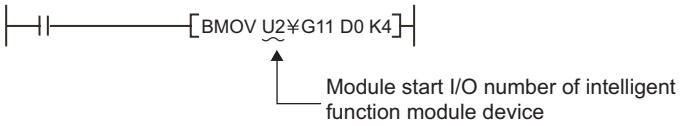
● Specification of the module I/O number

• When specifying a module I/O number, specify the actual module I/O number.
Example)




● Replacing module start I/O numbers of intelligent function module devices

Use the device replacing function to replace the module start I/O numbers of intelligent function module devices. (☞ GX Works2 Version 1 Operating Manual (Common))



# 8.2 Searching for and Replacing Data in SFC Programs

This section explains how to jump to the specified SFC step number or block number using the SFC diagram or SFC block list of the SFC program.
For the operations of device search/replace, instruction search/replace, and open/closed contact change functions, refer to the following manual.
☞ GX Works2 Version 1 Operating Manual (Common)

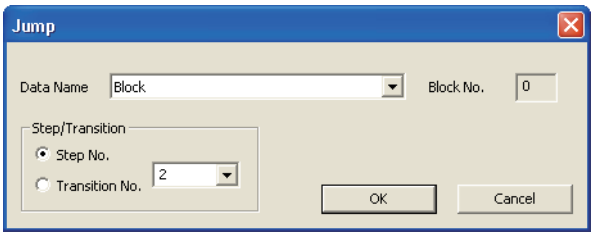
## 8.2.1 Jumping to specified SFC step number/transition number on SFC diagram

Q CPU L CPU FX

Jump to the SFC step number/transition number in the specified block when the cursor is placed on the SFC diagram.

### Screen display

Select [Find/Replace] ⇒ [Jump].




### Operating procedure

1. **Set the items on the screen.**

| Item | | Description |
|---|---|---|
| Data Name | | Select the block data name. |
| Block No. | | Display the block number corresponds to the "Data Name". |
| Step/Transition | | Set the jump destination of the SFC step number/transition number. |
| | Step No. | Select this to jump to the specified SFC step number. |
| | Transition No. | Select this to jump to the specified transition number. |

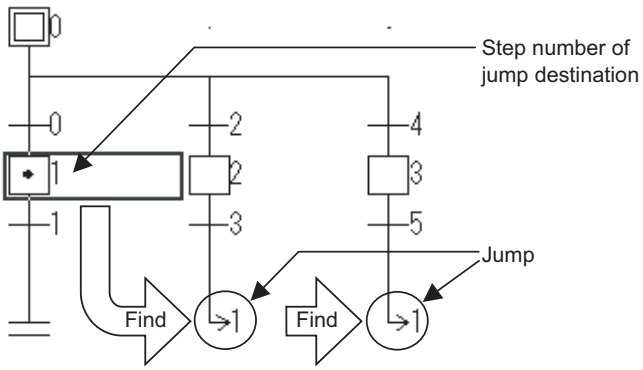
2. **Click the OK button.**

The cursor jumps to the SFC step number/transition number of the specified block.

## 8.2.2 Searching for jump with step number on SFC diagram

Q CPU L CPU FX

Search for a jump of jump source with specifying the step number of jump destination when the cursor is placed on a SFC diagram.




### Screen display

Select [Find/Replace] ⇒ [Find Jump Step].




### Operating procedure

1. **Enter a step number of jump destination.**

| Item | Description |
|---|---|
| Step number of jump destination | Enter the step number of jump destination<br>Click ▼ to select from the 10 step numbers of jump destination entered previously. |

2. **Click the Find button.**

   The cursor is moved to the jump of jump source.

**Point**

- **Jump**
  Select [Find/Replace] ⇒ [Find Jump Step] to move the cursor to a jump of jump source when the cursor is placed on a step.

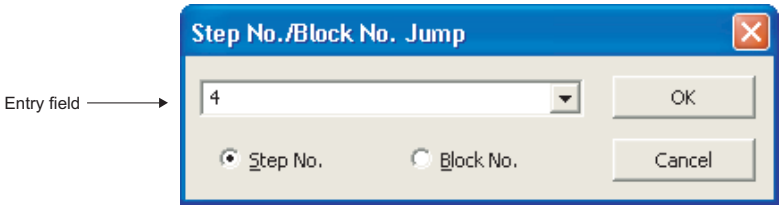
## 8.2.3 Jumping to specified SFC step number/block number on SFC diagram

Q CPU L CPU FX

Jump to the SFC step number/block number when the cursor is placed on the SFC diagram.

### Operating procedure

1. **Press the numeric key when the cursor is placed on the SFC diagram.**




2. **Set the items on the screen.**

| Item | Description |
|---|---|
| Entry field | Display the number that is entered on the SFC diagram.<br>Enter an SFC step number or block number of the jump destination. |
| Step No. | Select this to jump to the specified SFC step number. |
| Block No. | Select this to jump to the specified block number. |

3. **Click the OK button.**

When the "Step No." is selected, the cursor moves to the specified SFC step number in the block being edited.
When the "Block No." is selected, the SFC diagram of the specified block number is displayed.

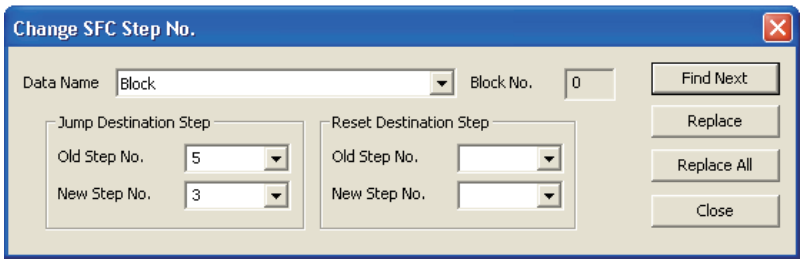
## 8.2.4 Replacing SFC step number on SFC diagram

Q CPU L CPU FX

Replace a jump destination step number or reset destination step number in each block.

### Screen display

Select [Find/Replace] ⇒ [Change SFC Step No.].




### Operating procedure

1. **Set the items on the screen.**

| Item | | Description |
|---|---|---|
| Data Name | | Select the block data name. |
| Block No. | | Display the block number corresponds to the "Data Name". |
| Jump Destination Step | | Enter old and new SFC step numbers when replacing the jump destination SFC step number. |
| | Old Step No. | Enter an old SFC step number.<br>Click ▼ to select from the list of jump destination step numbers used within the block. |
| | New Step No. | Enter a new SFC step number. |
| Reset Destination Step*1 | | Enter old and new SFC step numbers when replacing the reset destination SFC step number. |
| | Old Step No. | Enter an old SFC step number.<br>Click ▼ to select from the list of reset destination step numbers used within the block. |
| | New Step No. | Enter a new SFC step number. |

*1: Not supported by FXCPU.

2. **Click the [Find Next] button.**

The cursor moves to the searched SFC step number.

3. **Click the [Replace] or [Replace All] button.**

When the [Replace] button is selected, the old step number at the cursor position is replaced with the new step number. When the cursor is not at the old step number, it moves to the next searched step number.

When the [Replace All] button is selected, all old step numbers in the specified block are replaced with the new step number.

**Point**

● **Conversion/compilation status after replacing step numbers**
After replacing step numbers, the program becomes unconverted/uncompiled status. Convert or compile the program.

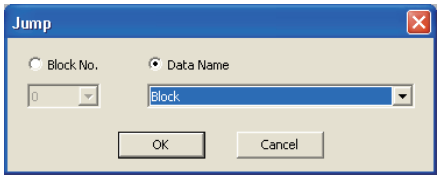
## 8.2.5 Searching for blocks on SFC block list

Q CPU L CPU FX

Search for a block or block title on the SFC block list.

### Screen display

Select [Find/Replace] ⇒ [Jump].




### Operating procedure

1. **Set the items on the screen.**

| Item | Description |
|---|---|
| Block No. | Select this to jump to the specified block number.<br>When the "Data Name" is selected, the block number corresponds to the "Data Name" is displayed. |
| Data Name | Select this to jump to the specified data name.<br>When the "Block No." is selected, the data name corresponds to the "Block No." is displayed. |

2. **Click the OK button.**

The cursor moves to the specified block.

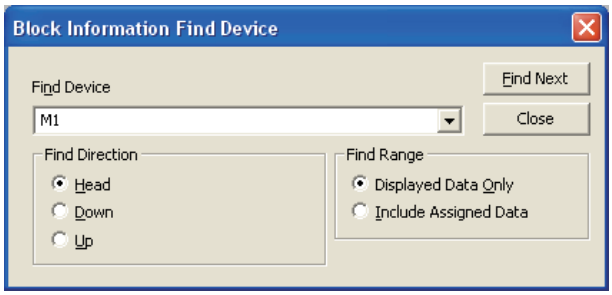
## 8.2.6 Searching for devices on SFC block list

Q CPU L CPU FX

Search for devices on the SFC block list.

### Screen display

Select [Find/Replace] ⇒ [Block Information Find Device].




### Operating procedure

1. **Set the items on the screen.**

| Item | | Description |
|---|---|---|
| Find Device | | Enter a device to be searched for.<br>Click ▼ to select from the list of ten devices entered previously. |
| Find Direction | Head | Select this to search for devices in the downward direction from the start of the program regardless of the current cursor position. |
| | Down | Select this to search for devices in the downward direction from the cursor position. |
| | Up | Select this to search for devices in the upward direction from the cursor position. |
| Find Range | Displayed Data Only | Select this to search for devices only within the data that are being displayed. |
| | Include Assigned Data | Select this to search for devices including those assigned to labels. |

2. **Click the** Find Next **button.**

The cursor moves to the searched device.

MEMO

# 9 EDITING COMMENTS/ STATEMENTS/NOTES

This chapter explains basic operation for editing device comments, statements, and notes.


9.1 Editing Device Comments . . . . . 9-2
9.2 Editing Statements and Notes . . . . . 9-2
9.3 Batch Editing Statements and Notes . . . . . 9-13
9.4 Changing the Type (PLC/Peripheral) of Statement/Note . . . 9-21
9.5 Displaying Line Statements on Tree View . . . . . 9-22
9.6 Jumping from Line Statement List . . . . . 9-27
9.7 Merge Process when Reading Programs from Programmable Controller CPU . . . . 9-28
9.8 Editing SFC Comments . . . . . 9-30

# 9.1 Editing Device Comments

Q CPU L CPU FX

For the method for editing device comments and the related functions, refer to the following manual.
☞ GX Works2 Version 1 Operating Manual (Common)

# 9.2 Editing Statements and Notes

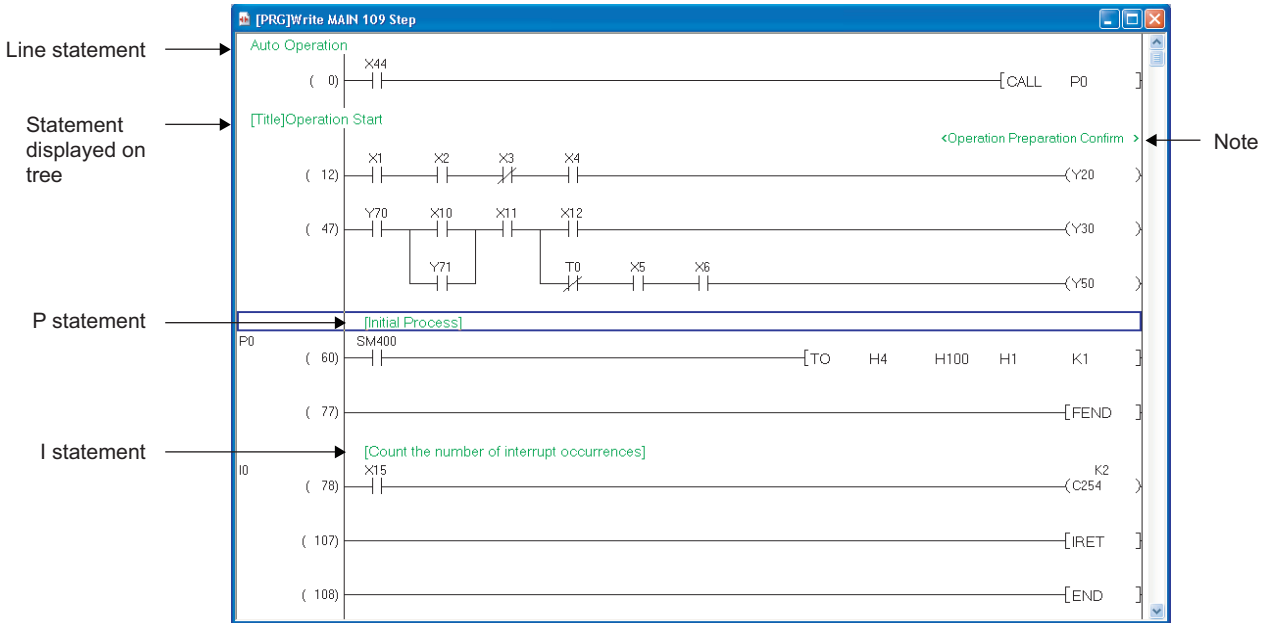
Q CPU L CPU FX

This section explains how to edit statements and notes, and the related functions.

## 9.2.1 Statements and notes

The following explains the overview of statements and notes, and the precautions on editing.

### Screen display



## ■ What is a statement?

A statement is a comment that is appended to a ladder block.
Appending statements makes the processing flow easy to understand.
Statements include line statements, P statements and I statements.
A line statement can be displayed on a tree view of the Navigation window.
(For details of the line statements displayed on a tree view ☞ Section 9.5)

- Line statement: A comment appended to a ladder block as a whole.
- P statement : A comment appended to a pointer number.
- I statement : A comment appended to an interrupt pointer number.

## ■ What is a note?

A note is a comment that is appended to a coil and application instruction.
Appending notes makes the details of coils and application instructions easy to understand.

## ■ Number of characters that can be entered

The following table shows the number of characters that can be entered for a statement or note.

| Name | Number of characters |
|---|---|
| Line statement | 64 characters |
| P statement | 64 characters |
| I statement | |
| Note | 32 characters |

## ■ Types of statement and note

'PLC' and 'Peripheral' are the types of statement and note.

| Name | | Applicable model | Function |
|---|---|---|---|
| PLC | Line statement<br>P statement<br>I statement | QCPU (Q mode)/ LCPU | • Statements and notes can be stored in the programmable controller CPU.<br>• PLC statement uses the following number of steps.<br>$2 + \frac{\text{Number of characters}}{2}$ steps (Decimal fraction is rounded up) |
| | Note | | |
| Peripheral | Line statement<br>P statement<br>I statement | QCPU (Q mode)/ LCPU/ FXCPU | • Statements and notes cannot be stored in the programmable controller CPU. (Only the position information can be stored.) Statements and notes must be saved in a peripheral equipment.<br>• One statement or note line uses one step.<br>• A * symbol is prefixed to the entered text automatically. |
| | Note | | |

**Point**

● **Statement/note types for FXCPU**
Only the Peripheral statement/note function is available for FXCPU.
The settings regarding 'PLC/Peripheral' type described in this section cannot be used.

● **Precautions when editing Peripheral statements/notes in FXCPU**
- The positioning data cannot be stored in FXCPU.
- Steps are not expended in FXCPU projects without labels.

## 9.2.2 Entering statements

Enter line statements, P statements, and I statements.

### ■ Entering line statements

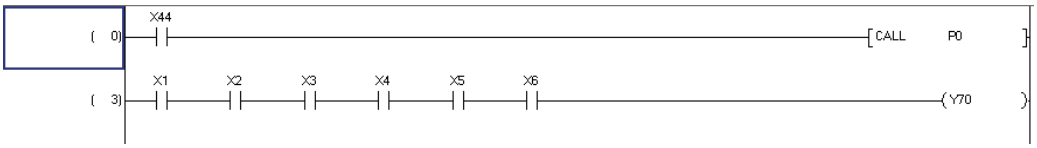
Enter a line statement.

| Item | Toolbar |
|---|---|
| Statement |  |

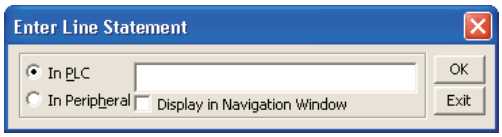
### Operating procedure

1. **Select [Edit] ⇒ [Documentation] ⇒ [Statement] ( ).**
   The statement entry mode is established.

2. **Move the cursor to the left end of the ladder block where a line statement is entered.**

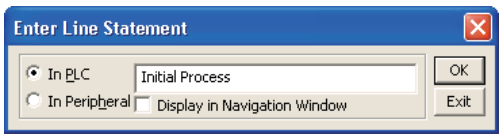



3. **Press the Enter key.**
   The Enter Line Statement screen is displayed.



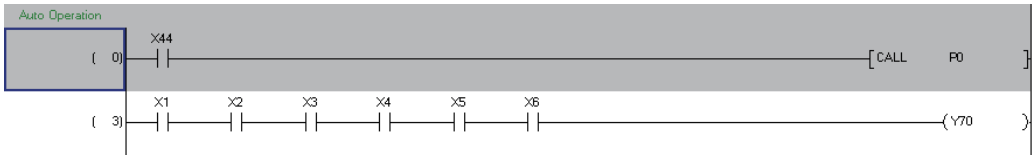

4. **Select the statement type; "In PLC" or "In Peripheral".**
   PLC statement is not supported by FXCPU.

5. **Enter a line statement.**




6. **Check "Display in Navigation Window" to display a line statement on a tree view of the Navigation window.**
   "[Title]" is entered in front of the line statement.
   This function is not supported by FXCPU projects without labels.

7. **Click the OK button.**
   The entered line statement is displayed on the editing screen.
   When "In Peripheral" is selected, '*' is automatically prefixed to the line statement.
   When displaying a line statement on a tree view of the Navigation window, "[Title]" is appended in front of the line statement.

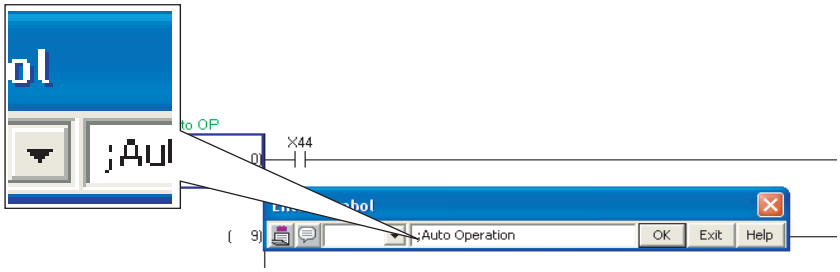


8. **To disable the line statement entry mode, select [Edit] ⇒ [Documentation] ⇒ [Statement] ( ) again.**
   The statement entry mode is disabled.

**Point**

- **Line statements can be entered on the Enter Symbol screen.**
  Move the cursor to the left end of the ladder block where a line statement is entered and press the Enter key.
  The Enter Symbol screen is displayed. Enter a line statement as shown below.

  Enter a line statement after entering ';' for PLC ', ';*' for Peripheral. When displaying a line statement on a project view, enter [Title] after ';' or ';*'.




- **Displaying statements on the editing screen.**
  Display/hide of statements can be switched by selecting [View] ⇒ [Statement]. (☞ Section 2.2.4)

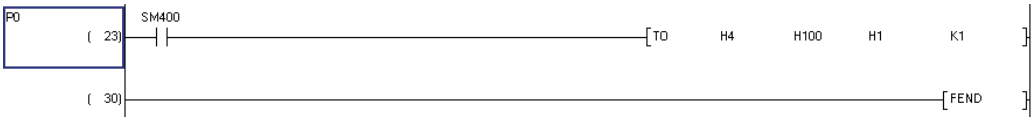
## ■ Entering P statements and I statements

Enter a P statement or I statement.

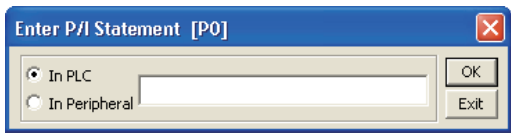
### Operating procedure

1. **Select [Edit] ⇒ [Documentation] ⇒ [Statement] ( ).**
   The statement entry mode is established.

2. **Move the cursor to the pointer number or interrupt pointer number where a P statement or I statement is entered.**

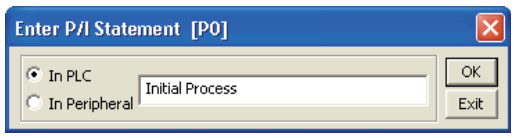



3. **Press the Enter key.**
   The Enter P/I Statement screen is displayed.



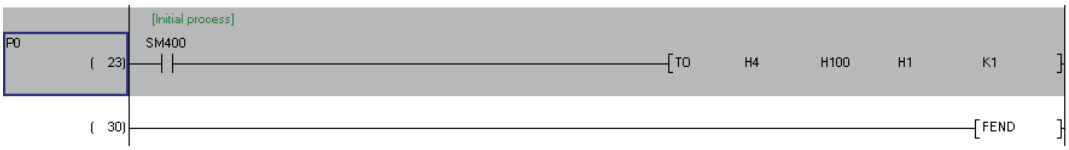

4. **Select the statement type; "In PLC" or "In Peripheral".**
   PLC statement is not supported by FXCPU.

5. **Enter a P or I statement.**



6. **Click the OK button.**

The entered P or I statement is displayed on the editing screen.
P and I statements are enclosed by brackets [ ].



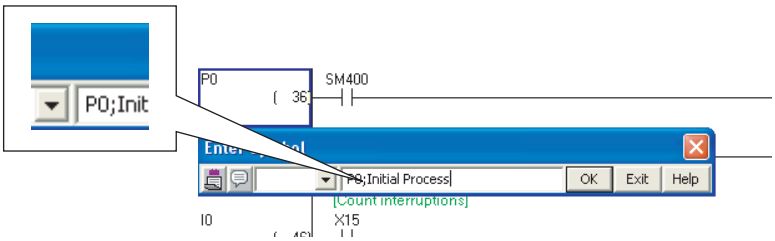

7. **To disable the P statement/I statement entry mode, select [Edit] ⇒ [Documentation] ⇒ [Statement] ( ) again.**

The statement entry mode is disabled.

**Point**

- **P or I statements can be entered on the Enter Symbol screen.**
  **Move the cursor to the pointer number or interrupt pointer number where a P or I statement is entered and press the Enter key.**
  The Enter Symbol screen is displayed. Enter a line statement as shown below.

  Following the already entered pointer number or interrupt pointer number, enter ';' for 'PLC' and ';*' for 'Peripheral', and then enter a P or I statement.




- **Displaying statements on the editing screen.**
  Display/hide of statements can be switched by selecting [View] ⇒ [Statement]. (☞ Section 2.2.4)

## 9.2.3 Modifying and deleting statements

Modify and delete statements.

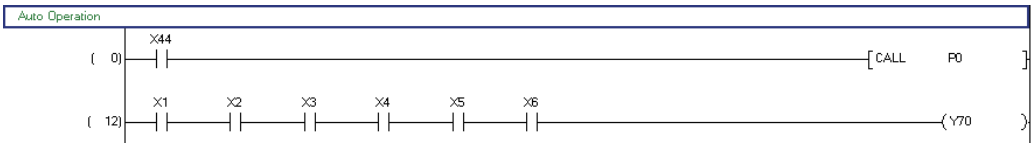
### ■ Modifying statements

Modify a statement.

#### Operating procedure

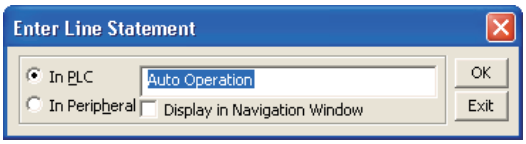
1. **Select [Edit] ⇒ [Documentation] ⇒ [Statement] ( ).**
   The statement entry mode is established.

2. **Move the cursor to the statement to be modified.**

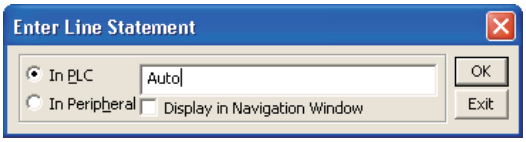



3. **Press the Enter key.**
   For line statements, the Enter Line Statement screen is displayed.

   For P and I statements, the Enter P/I Statement screen is displayed.




4. **Change the type and/or modify the statement.**




5. **Click the OK button.**
   The modified statement is displayed on the editing screen.

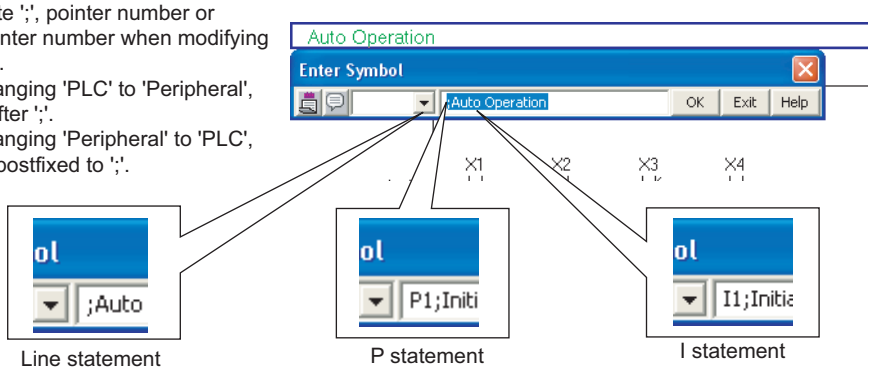
6. **To disable the statement entry mode, select [Edit] ⇒ [Documentation] ⇒ [Statement] ( ) again.**
   The statement entry mode is disabled.

**Point**

● **Statements can be modified on the Enter Symbol screen.**

Move the cursor to the statement to be modified and press the Enter key.
The Enter Symbol screen is displayed. Modify the statement as shown below.

Do not delete ';', pointer number or interrupt pointer number when modifying a statement.
- When changing 'PLC' to 'Peripheral', enter '*' after ';'.
- When changing 'Peripheral' to 'PLC', delete '*' postfixed to ';'.




● **Displaying statements on the editing screen.**

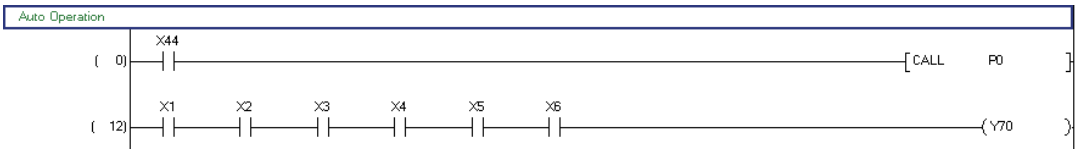
Display/hide of statements can be switched by selecting [View] ⇒ [Statement]. (☞ Section 2.2.4)

## ■ Deleting statements

Delete a line statement, P statement or I statement.

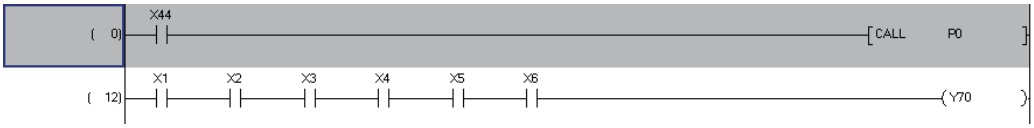
### Operating procedure

**1. Move the cursor to the statement to be deleted.**




**2. Press the Delete key.**

The statement is deleted.




**Point**

● **Displaying statements on the editing screen**

Display/hide of statements can be switched by selecting [View] ⇒ [Statement]. (☞ Section 2.2.4)

## 9.2.4 Entering notes

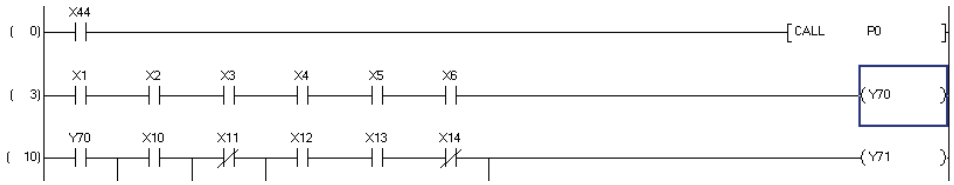
Enter a note in the program.

| Item | Toolbar |
|---|---|
| Note | |

### Operating procedure

1. **Select [Edit] ⇒ [Documentation] ⇒ [Note] ( ).**
   The note entry mode is established.

2. **Move the cursor to the coil or application instruction to which a note is appended.**

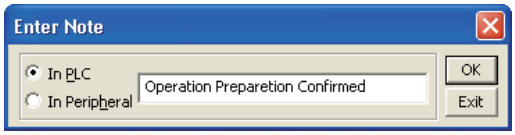



3. **Press the Enter key.**
   The Enter Note screen is displayed.

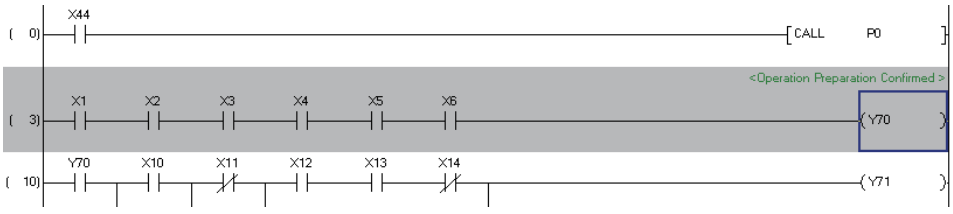



4. **Select the note type; "In PLC" or "In Peripheral".**
   PLC note is not supported by FXCPU.

5. **Enter a note.**




6. **Click the OK button.**
   The entered note is displayed on the editing screen.
   When "In Peripheral" is selected, '*' is automatically prefixed to the note.



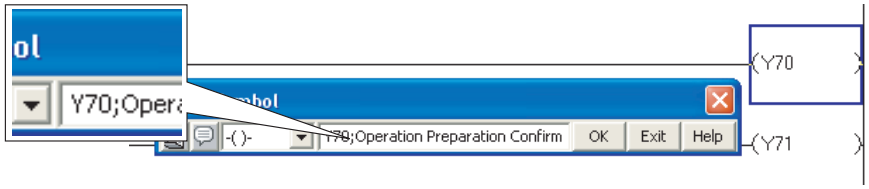

7. **To disable the note entry mode, select [Edit] ⇒ [Documentation] ⇒ [Note] ( ) again.**
   The note entry mode is disabled.

**Point**

● **Notes can be entered on the Enter Symbol screen.**

Move the cursor to the coil or application instruction to which a note is appended and press the Enter key.
The Enter Symbol screen is displayed. Enter a note as shown below.

Following the already entered device/instruction, enter ';' for, 'PLC' and ';*' for 'Peripheral' first, and then enter a note.




● **Displaying notes on the editing screen.**

Display/hide of notes can be switched by selecting [View] ⇒ [Note]. (☞ Section 2.2.4)

## 9.2.5 Modifying and deleting notes

Modify and delete notes.

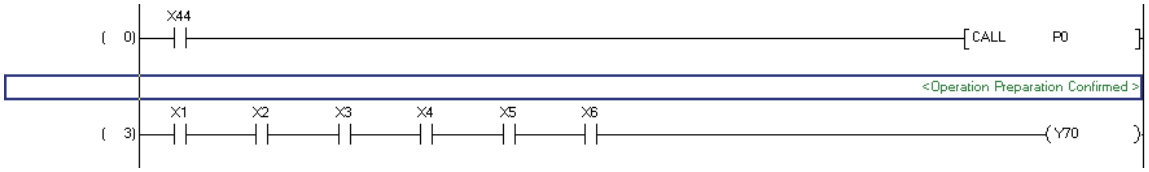
### ■ Modifying notes

Modify a note.

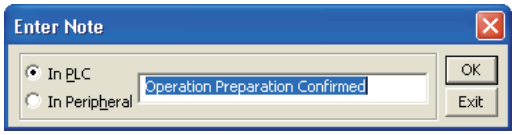
#### Operating procedure

1. **Select [Edit] ⇒ [Documentation] ⇒ [Note] ( ).**
   The note entry mode is established.

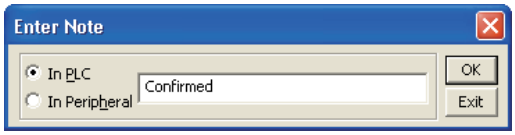
2. **Move the cursor to the note to be modified.**




3. **Press the Enter key.**
   The Enter Note screen is displayed.




4. **Change the type and/or modify the note.**




5. **Click the OK button.**
   The modified note is displayed on the editing screen.

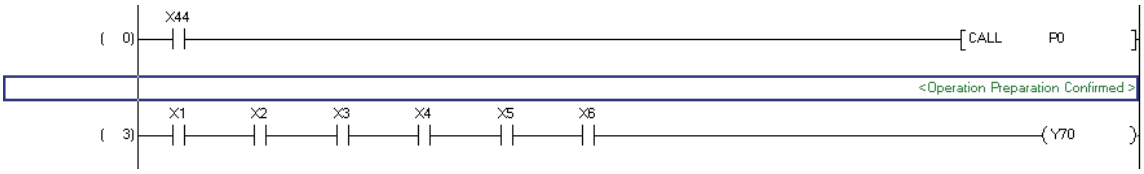
6. **To disable the note entry mode, select [Edit] ⇒ [Documentation] ⇒ [Note] ( ) again.**
   The note entry mode is disabled.

## ■ Deleting notes

Delete a note.

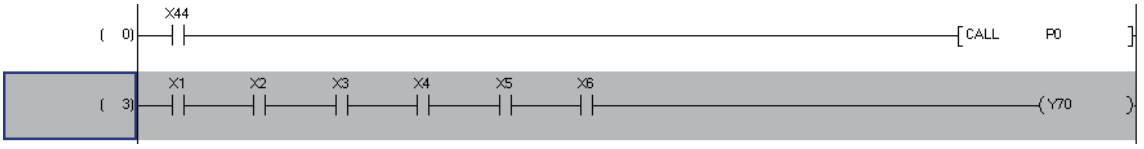
### Operating procedure

**1. Move the cursor to the note to be deleted.**




**2. Press the Delete key.**

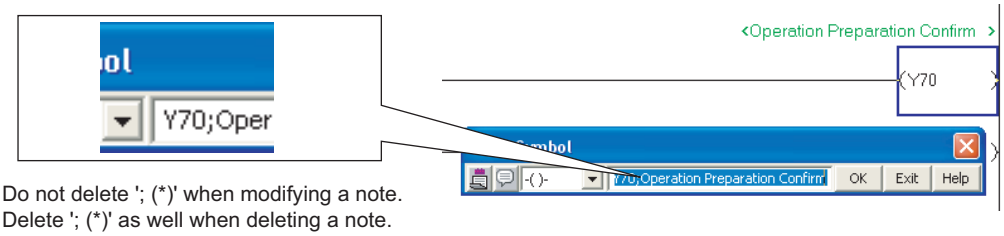
The note is deleted.




### Point

● **Notes can be modified or deleted on the Enter Symbol screen.**

Move the cursor to the coil or application instruction whose note is deleted or modified and press the Enter key. The Enter Symbol screen is displayed. Modify or delete the note as shown below.




Do not delete '; (*)' when modifying a note.
Delete '; (*)' as well when deleting a note.
- When changing 'PLC' to 'Peripheral', enter '*' after ';'.
- When changing 'Peripheral' to 'PLC', delete '*' postfixed to ';'.

● **Displaying notes on the editing screen.**

Display/hide of notes can be switched by selecting [View] ⇒ [Note]. (☞ Section 2.2.4)

# 9.3 Batch Editing Statements and Notes

Q CPU L CPU FX

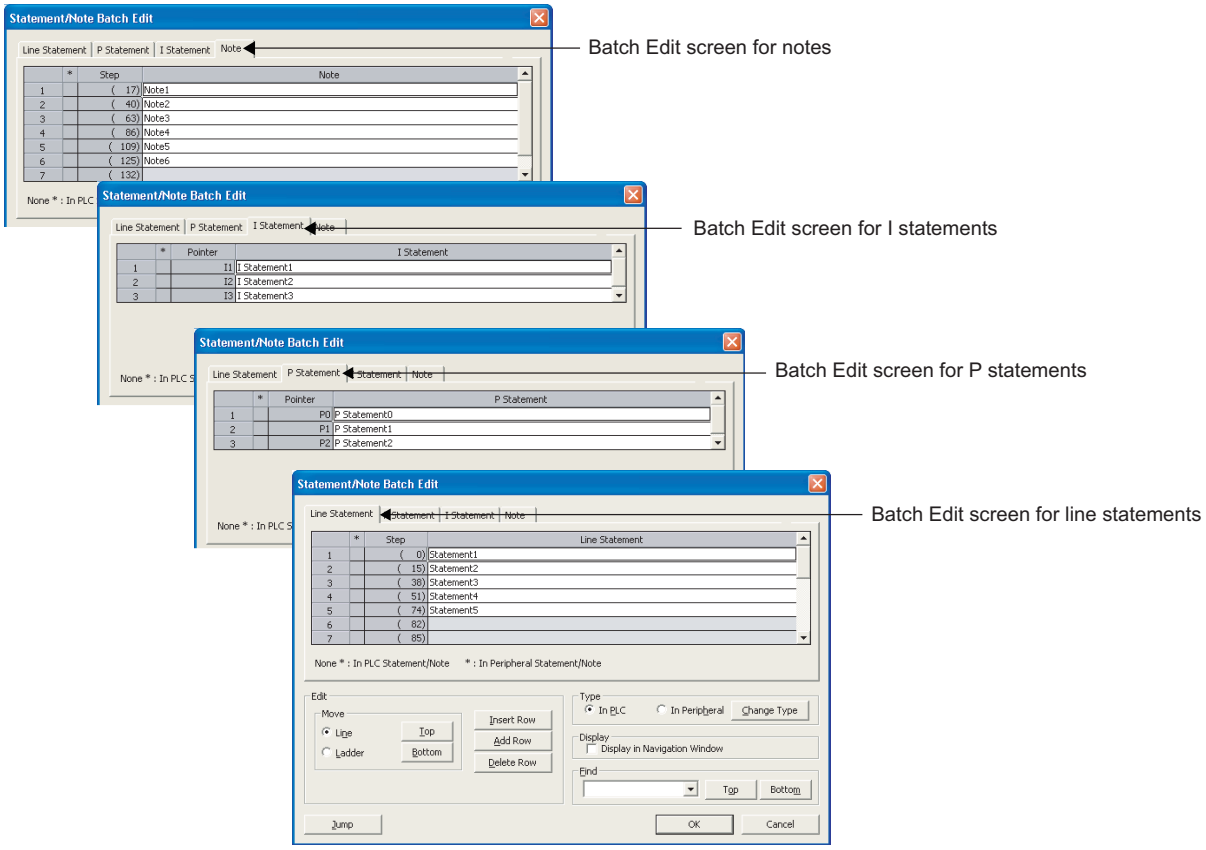
This section explains how to batch edit statements and notes.

**Restrictions**

**Batch editing of statements and notes cannot be performed when function blocks or inline structured text are used in a program.**

## Screen display

Select [Edit] ⇒ [Documentation] ⇒ [Statement/Note Batch Edit]. ( )



## Display contents

| Item | | Description |
|---|---|---|
| Tab | Line Statement | Display the batch-edit screen for line statements. |
| | P Statement | Display the batch-edit screen for P statements. |
| | I Statement | Display the batch-edit screen for I statements. |
| | Note | Display the batch-edit screen for notes. |
| Step | Line Statement | Display the start step numbers of all ladder blocks in the program. |
| | Note | Display the step numbers of all coils and application instructions in the program. |
| Pointer | P Statement | Display all pointer numbers in the program. |
| | I Statement | Display all interrupt pointer numbers in the program. |

## Screen button

- Change type

  Changes the type between 'PLC' and 'Peripheral'.

- Insert Row

  Inserts a row above the selected line statement.

- Add Row

  Inserts a row below the selected line statement.

- Delete Row

  Deletes a line statement.

- Top

  "Edit" : Moves the statement upward.
  "Find" : Executes search in the upward direction from the selected statement or note.

- Bottom

  "Edit" : Moves the statement downward.
  "Find" : Executes a search in the downward direction from the selected statement or note.

- Jump

  Moves the cursor to the selected statement or note on the editing screen.

**Point**

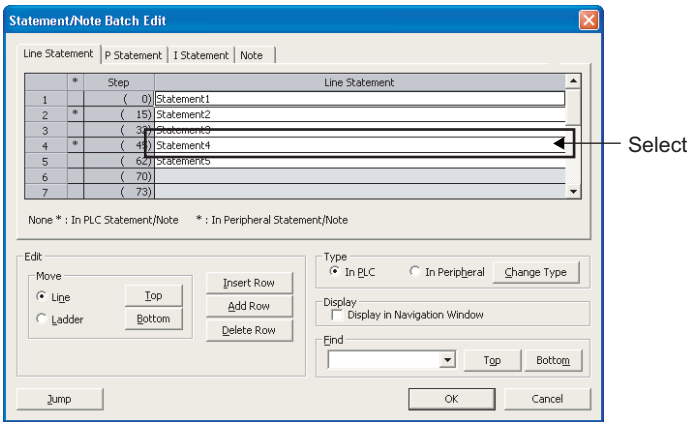
● **Precautions when editing statements/notes in FXCPU.**
The PLC statement/note function is not available for FXCPU.
Thus the settings regarding 'PLC/Peripheral' type described in this section cannot be used.
For details of the 'PLC/Peripheral' type, refer to Section 9.2.1.

## ■ Modifying statements and notes

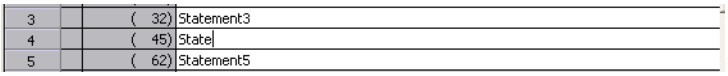
Modify a statement or note.

### Operating procedure

**1. Select a statement or note to be modified.**




**2. Modify the statement or note.**




## ■ Changing the type of statements and notes

Change the 'PLC' or 'Peripheral' type of a statement or note.

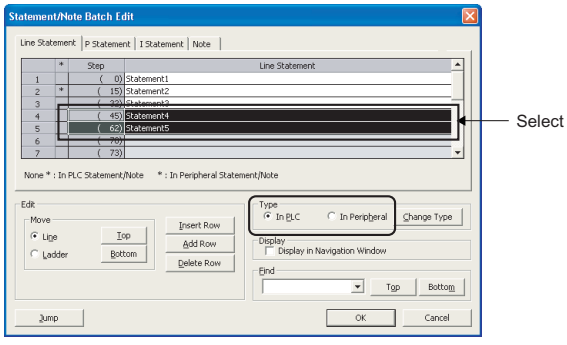
### Operating procedure

**1. Select a range in which the type is changed.**

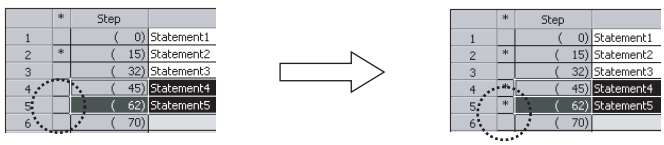
**2. Select the statement/note type; "In PLC" or "In Peripheral".**

**3. Click the** Change type **button.**

The type is changed.
A * symbol is appended to a statement or note set as 'Peripheral'.




Change from 'PLC' to 'Peripheral'



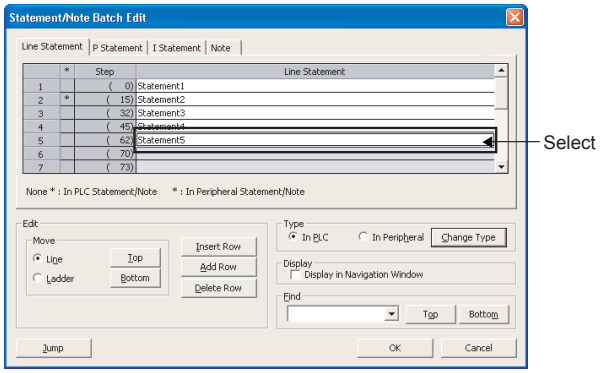
## ■ Displaying line statements on tree view

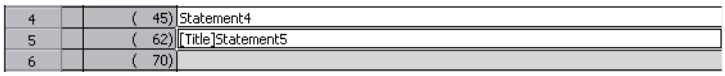
Display a line statement on a tree view of the Navigation window.
This function is not supported by FXCPU projects without labels.

### Operating procedure

1. **Select a line statement to be displayed on a tree view.**

2. **Check the "Display in Navigation Window" item.**
   "[Title]" is inserted in front of the line statement.




## ■ Inserting rows within line statements

Insert a row within line statements.

### Operating procedure

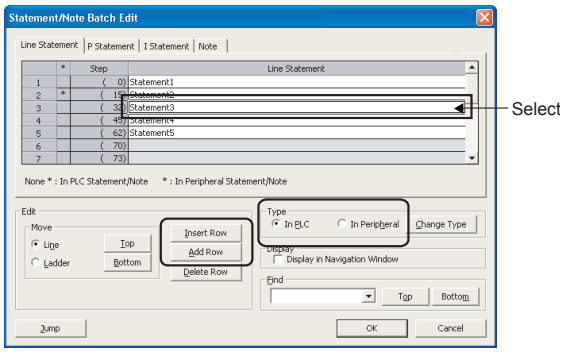
1. **Select a statement for which a row is to be inserted.**

2. **Select the statement type; "In PLC" or "In Peripheral".**

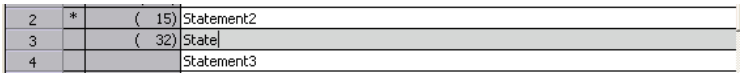
3. **Click the** Insert Row **or** Add Row **button.**

   Insert Row : Inserts a blank row above the cursor position.

   Add Row : Inserts a blank row below the cursor position.




4. **Select the inserted row and enter a statement.**

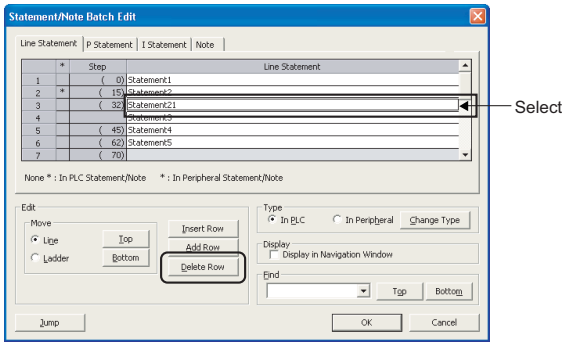


## ■ Deleting rows of line statements

Delete a row of line statements.

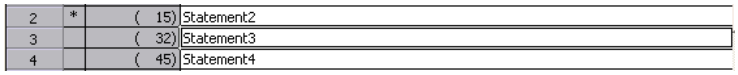
### Operating procedure

1. **Select the line statement to be deleted.**




2. **Click the** Delete Row **button.**

   The selected line statement is deleted.




## ■ Moving statements or notes

Move a statement or note.

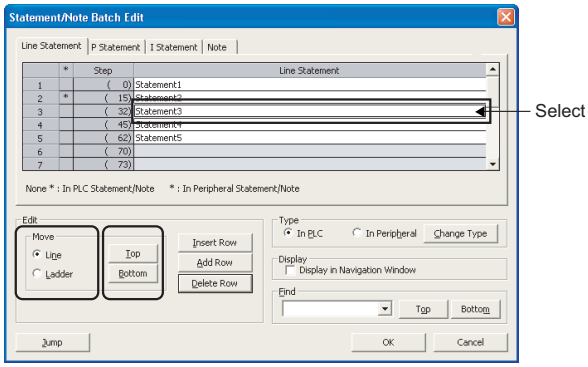
### Operating procedure

1. **Select a statement or note to be moved.**

2. **To move a line statement, select the type; "Line" or "Ladder".**

   "Line" : Moves the selected line statement in unit of row.

   "Ladder" : Moves the selected line statement in unit of ladder block.



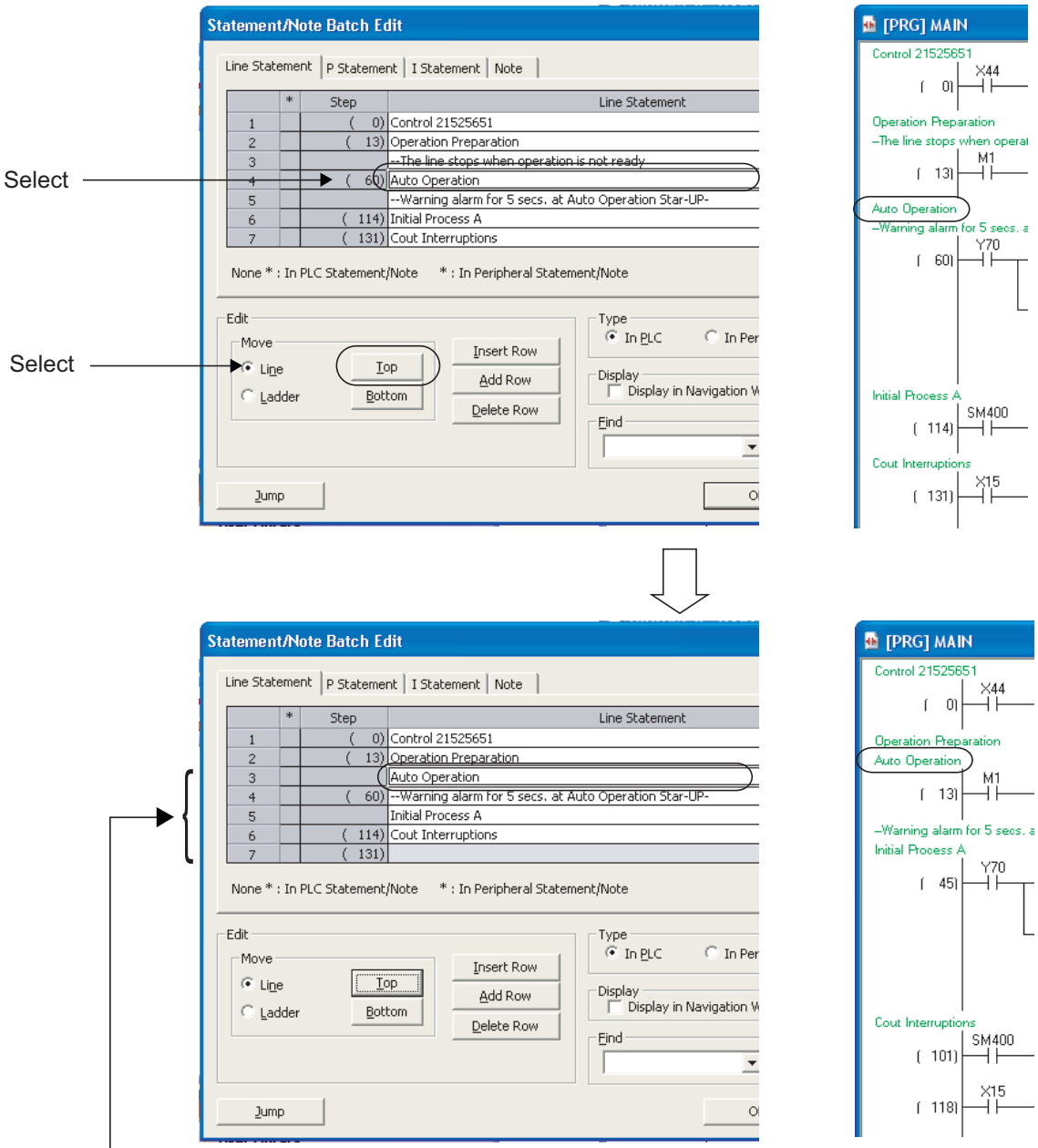

3. **Click the** Top **or** Bottom **button.**

   Top : Moves the selected statement or note upward.

   Bottom : Moves the selected statement or note downward.

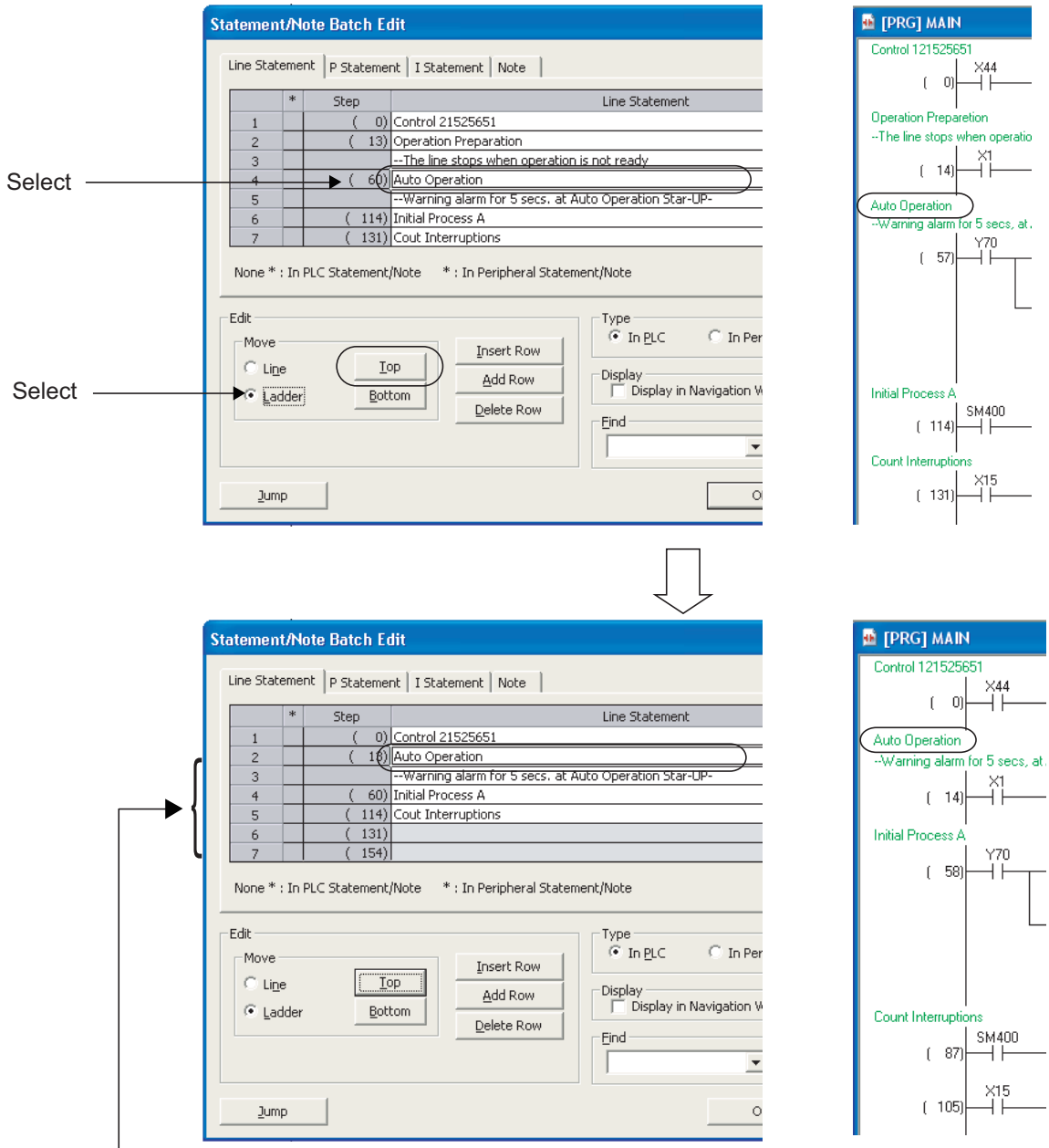
Editing examples)

Move Step 60 upward in unit of row




The line statement one above the selected statement is deleted, and the selected statement moves upward.

Move Step 60 upward in unit of ladder block




The unit of line statements one step above the selected statement is deleted, and the selected statement moves one step upward.

## ■ Searching for statements and notes

Search for a statement or note.

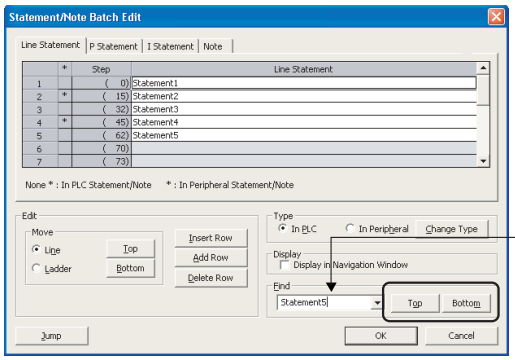
### Operating procedure

1. **Enter a statement or note to be searched for in the "Find" field.**

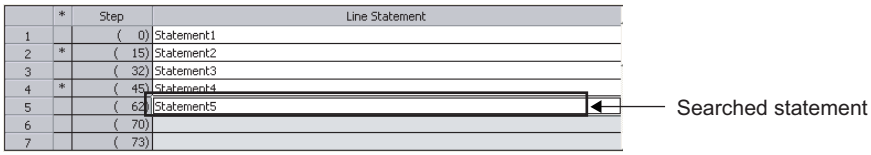
2. **Click the Top or Bottom button.**

   Top : Starts searching in the upward direction from the selected position.

   Bottom : Starts searching in the downward direction from the selected position.




3. **The cursor moves to the searched statement or note.**

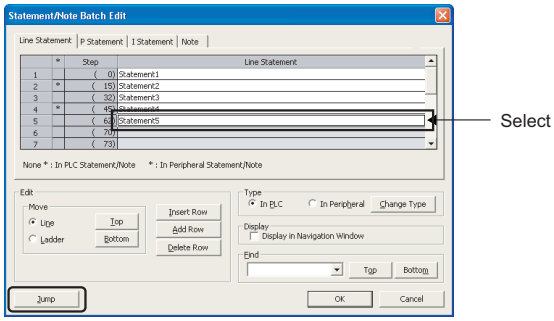



## ■ Jumping to specified statement and note

Jump to a specified statement or note.

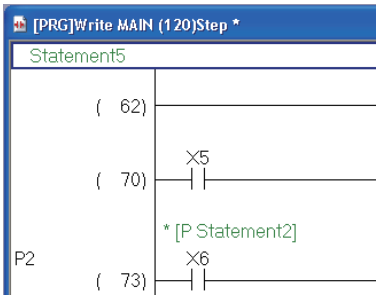
### Operating procedure

1. **Select a statement or note for the jump target.**




2. **Click the Jump button.**

   The cursor jumps to the selected statement or note on the editing screen.



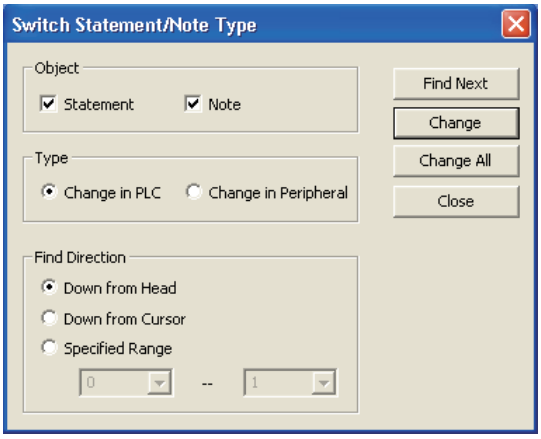
# 9.4 Changing the Type (PLC/Peripheral) of Statement/Note

Q CPU L CPU FX

This section explains how to change the statement/note type of the converted program to PLC or Peripheral.

## Screen display

Select [Find/Replace] ⇒ [Switch Statement/Note Type].




## Operating procedure

### 1. Set the items on the screen.

| Item | | Description |
|---|---|---|
| Object | | Check this to select the target whose type is to be changed. Multiple objects can be selected. |
| Type | Change in PLC | Select this to change 'Peripheral' to 'PLC'. |
| | Change in Peripheral | Select this to change 'PLC' to 'Peripheral'. |
| Find Direction | Down from Head | Select this to execute a search in the downward direction from the start of the program regardless of the current cursor position. |
| | Down from Cursor | Select this to execute a search in the downward direction from the cursor position. |
| | Specified Range | Select this to execute a search in the range set by the entered step numbers. |

### 2. Click the Find Next button.

The cursor moves to the searched statement or note.

### 3. Click the Change or Change All button to change the type.

The type is changed, and the search for the next statements or notes continues.

If the Change All button is clicked, the types are batch replaced for all searched statements or notes.

**Point**

- **Switch statement/note type function**

  The statement/note type at the cursor position can also be changed by pressing the Ctrl + : keys. Convert the program when this function is performed as the program becomes unconverted status.

- **When statements/notes are not entered at the right position**

  When statements/notes are not entered at the right position even after the merge process is performed, correct their positions using the statement/note batch editing function. (☞ Section 9.3)

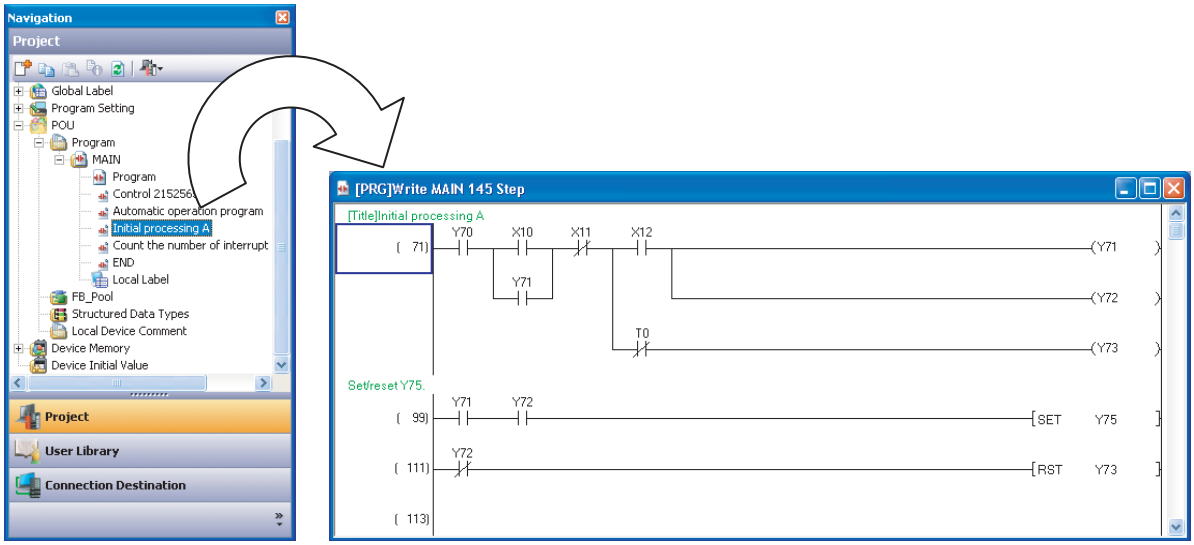
# 9.5 Displaying Line Statements on Tree View

Q CPU L CPU FX

This section explains a line statement displayed on a tree view of the Navigation window.
This function is not supported by FXCPU projects without labels.

## 9.5.1 Line statements on tree view

The line statements can be displayed on a tree view of the Navigation window.
Displaying the line statements on a tree view provides the easy-to-understand general program flow.
It also provides the quick search of ladder blocks since the program where the line statement is set can be displayed with the line statements on a tree view.




**Point**

- **Program range which can be displayed with line statements on tree view**
  Double-click a line statement on a tree view to jump to a ladder block where corresponding line statement is set.
  The programs before the next line statement on a tree view are displayed by the jump function.
  If there are no next line statements on a tree view, the programs before the END instruction are displayed.
  Double-click "Program" under Project view ⇒ "POU" ⇒ "Program" ⇒ "(program)" ⇒ "(block)" ⇒ "Program" of the Navigation window to display a whole program.
- **Copying/pasting line statements on tree view**
  When copying or pasting the line statements on a tree view, the ladder blocks from a line statement on a tree view in a ladder to the programs before the next line statement on a tree view are copied or pasted.

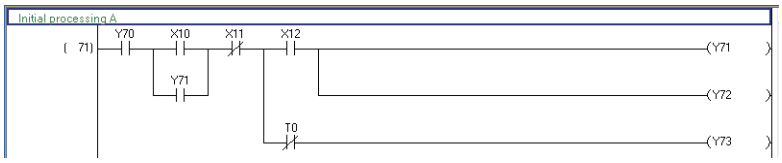
## 9.5.2 Displaying line statements on tree view

Display a line statement on a tree view of the Navigation window.

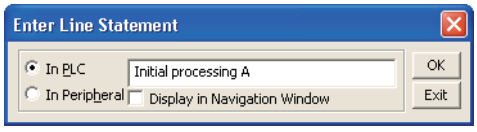
### Operating procedure

1. **Select [Edit] ⇒ [Documentation] ⇒ [Statement] ( ).**
   The statement entry mode is established.

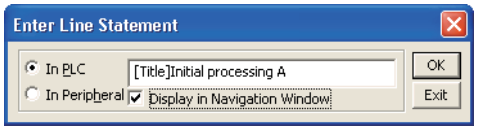
2. **Move the cursor to a line statement to be displayed on a tree view.**




3. **Press the Enter key.**
   The Enter Line Statement screen is displayed.

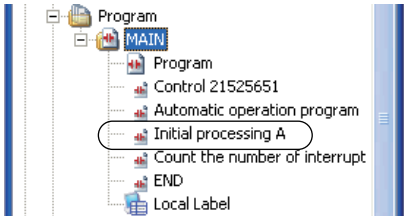



4. **Check "Display in Navigation Window", or enter "[Title]" in front of the line statement.**




5. **Click the OK button.**

6. **Select [Compile] ⇒ [Build].**
   The line statement is displayed on a tree view.
   When multiple line statements on a tree view exist in single ladder block, only the uppermost line statement is displayed on a tree view.




**Point**

- **Displaying line statements of POUs on tree view**
  Only the line statements of programs can be displayed on a tree view.
  Even if entering "[Title]" in front of the line statement of function block, the line statements cannot be displayed on a tree view.
- **Maximum number of line statements on tree view**
  The maximum number of line statements on a tree view in single program is 100.
  The maximum number of line statements on a tree view in single project is 800.
  When multiple line statements on a tree view exist in single ladder block, only the uppermost line statement is displayed and the others are not, however, all line statements are counted as the number of line statements on a tree view.

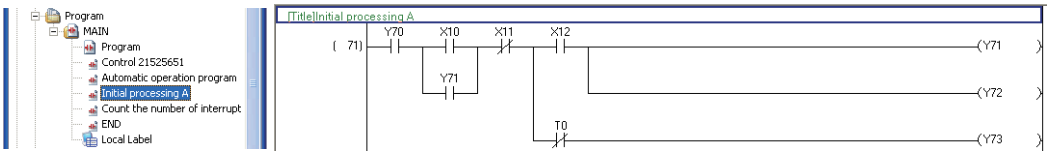
## 9.5.3 Disabling setting of line statements on tree view

Change the setting of line statements on a tree view to hide.

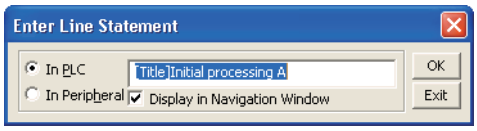
### Operating procedure

1. **Select [Edit] ⇒ [Documentation] ⇒ [Statement] ( ).**
   The statement entry mode is established.

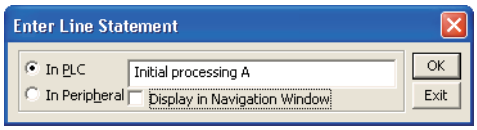
2. **Move the cursor to a line statement on a tree view.**




3. **Press the Enter key.**
   The Enter Line Statement screen is displayed.

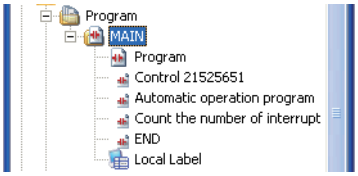



4. **Uncheck "Display in Navigation Window", or delete "[Title]" in front of the line statement.**




5. **Click the OK button.**

6. **Select [Compile] ⇒ [Build].**
   The line statement is deleted from the tree.
   If there are no line statements on a tree view in a program, the END instructions are also deleted from a tree.




**Point**

● **Precautions on deleting line statements on tree view**
When deleting the line statements on the Navigation window, the ladder blocks from a line statement on a tree view on a ladder to the programs before the next line statement on a tree view are also deleted.
(☞ Section 9.5.5)

## 9.5.4 Moving ladder blocks on tree view

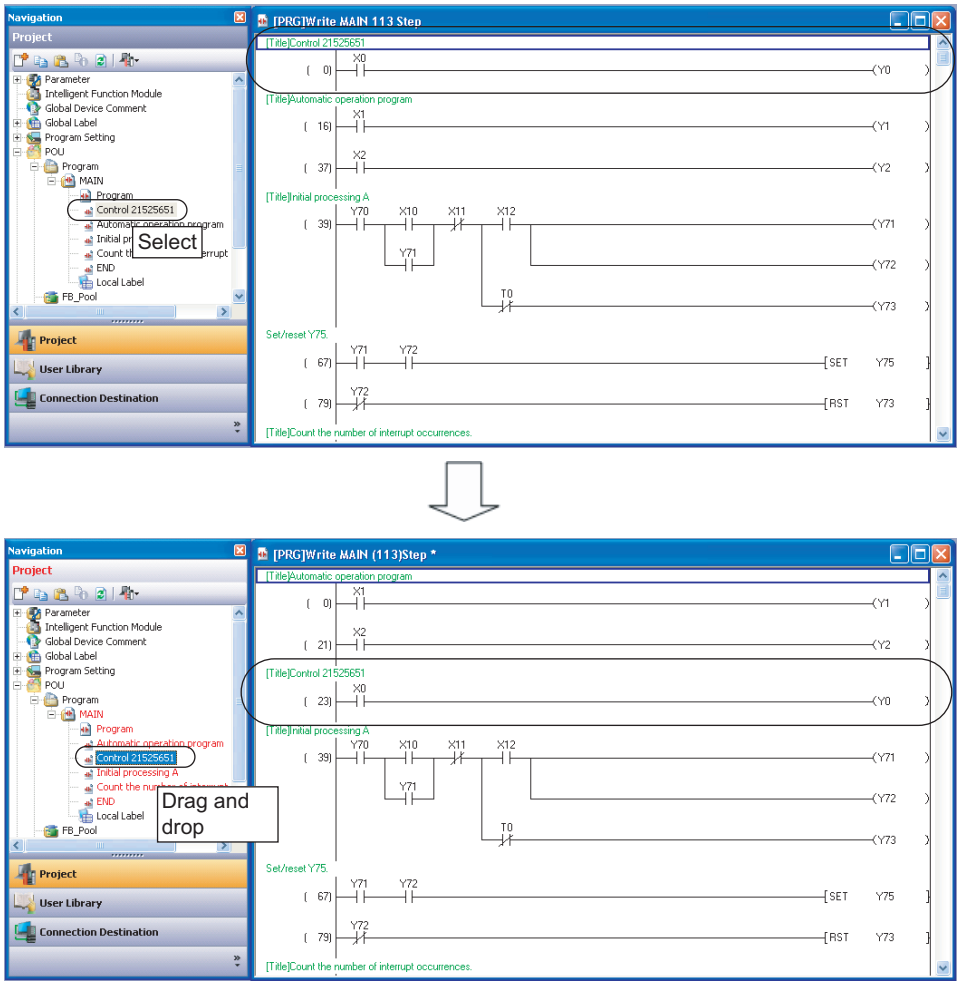
Move the ladder blocks on a tree view of the Navigation window from a line statement on a tree view to the programs before the next line statement on a tree view.

### Operating procedure

1. **Select a line statement on a tree view on the Navigation window.**

2. **Drag and drop the line statement to the desired position on the program.**

   The ladder blocks from the selected line statement on a tree view to before the next line statement on a tree view are moved.




**Point**

- **Copying to other programs**
  When copying the ladder blocks within the range from a line statement on a tree view to the programs before the next line statement on a tree view to other programs, drag and drop the line statement on a tree view of other programs.
  The copied ladder blocks are pasted in front of the END instruction.

## 9.5.5 Deleting ladder blocks on tree view

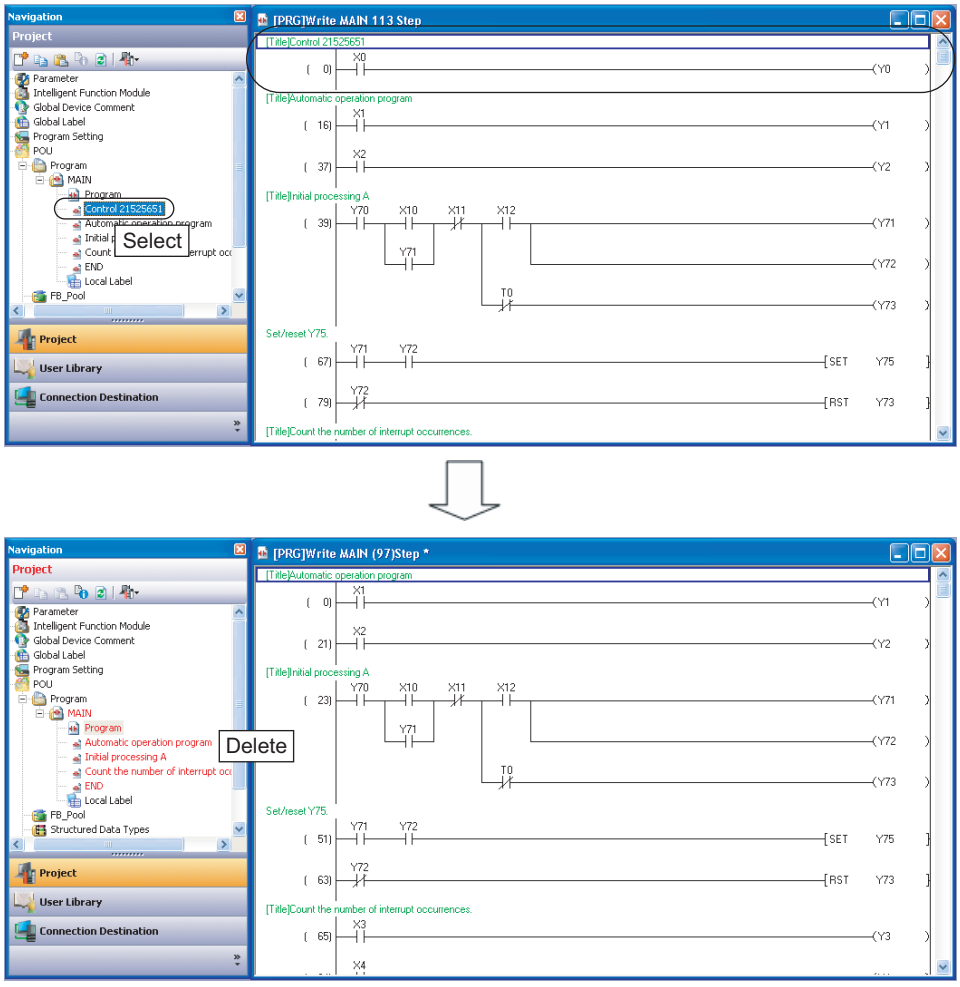
Delete the ladder blocks on a tree view of the Navigation window from a line statement on a tree view to the programs before the next tree-displayed line statement.

### Operating procedure

1. **Select a line statement on a tree view on the Navigation window.**

2. **Select [Project] ⇒ [Object] ⇒ [Delete].**

   The ladder blocks from the selected line statement on a tree view to the programs before the next line statement on a tree view are deleted.



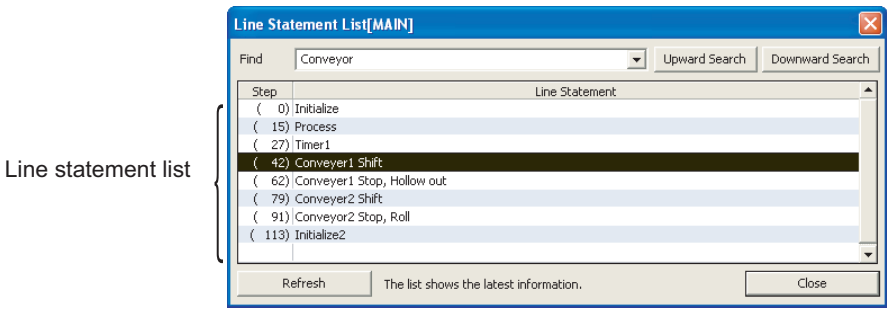
# 9.6 Jumping from Line Statement List

Q CPU L CPU FX

This section explains the function that displays line statements used in the ladder program and searches for a specified line statement.
The corresponding line statement in the program is displayed by jumping from the list.

## Screen display

Select [Find/Replace] ⇒ [Line Statement List] ( ).




## Operating procedure

### 1. Set the items on the screen.

| Item | | Description |
|---|---|---|
| Find | | Enter a character string of the line statement to be searched for.<br>Click to select from the list of character strings searched previously. |
| Line statement list | | Display a list of line statements used in the program. |
| | Step | Display step numbers to which the line statements are set. |
| | Line statement | Display line statements used in the program. |

### 2. Double-click the selected row in the line statement list.

The position jumps from the line statement list to the corresponding line statement on the program editor.

## Screen button

- Upward Search / Downward Search

  Searches for line statements that contain the character string entered in the "Find" field toward up/down direction from the cursor.

- Refresh

  Updates the line statement list.

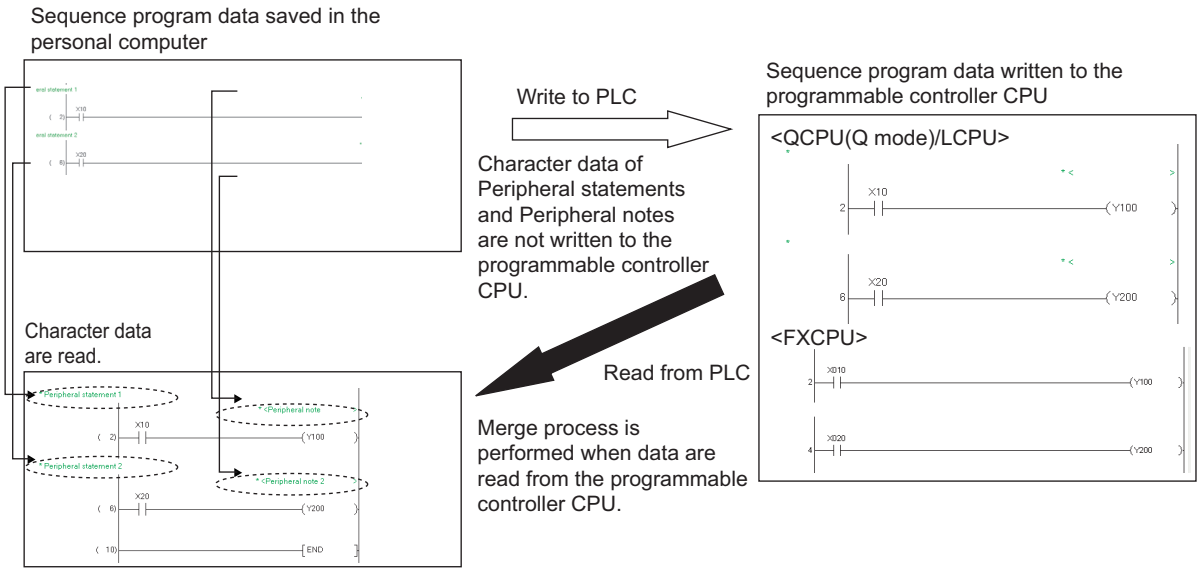
# 9.7 Merge Process when Reading Programs from Programmable Controller CPU

This section explains the merge process when reading sequence programs contain Peripheral statements/ notes created in the project without labels from the programmable controller CPU.
For FXCPU, the merge process is executed automatically when reading data from a programmable controller CPU. Thus the setting is not necessary.

## 9.7.1 Merge process

Q CPU L CPU FX

The character data of Peripheral statements/notes are not written to the programmable controller CPU when sequence programs are written to the programmable controller CPU.
By executing the merge process when reading sequence programs from the programmable controller CPU, the character data of Peripheral statements/notes saved in the personal computer are merged with the sequence programs stored in the programmable controller CPU and displayed in the ladder.




The following table shows the different process status with the execution of the merge process when reading programs from the programmable controller CPU.
For FXCPU, the merge process is executed automatically, and character data of the step position where data can be displayed, are read.

Table 9.7.1-1 Merge process status of Peripheral statement/note

| Setting | CPU type | Type | Process status |
|---|---|---|---|
| Not executing the merge process | QCPU (Q mode)/ LCPU | Peripheral statement | Character data are not read. |
| | | Peripheral note | |
| Executing the merge process | QCPU (Q mode)/ LCPU | Peripheral statement | Character data are read. |
| | | Peripheral note | |

## 9.7.2 Performing merge process

Q CPU L CPU FX

Perform the merge process when reading sequence programs from the programmable controller CPU.

### Operating procedure

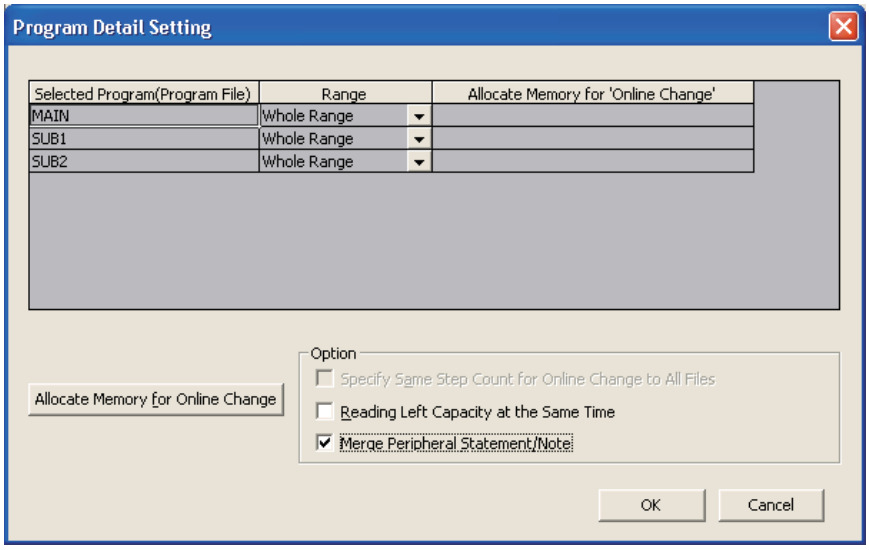
1. **Open the sequence program (project) saved in the personal computer.**

   Open the sequence program (project) which is the same data as the sequence program (project) to be read from the programmable controller CPU.
   For the method for opening a project, refer to the following manual.
   ☞ GX Works2 Version 1 Operating Manual (Common)

2. **Select [Online] ⇒ [Read from PLC] ( ).**

   The Online Data Operation screen is displayed.
   The Read from PLC function (☞ Section 11.1)

3. **Check the "Merge Peripheral Statement/Note" item under "Option" on the Program Detail Setting screen, and execute the Read from PLC function.**




4. **Confirm if the statements and/or notes of the read sequence program are entered at the correct positions.**

**Point**

- **When a statement or note is not entered at the correct position**
  Correct the statement and note positions by the statement/note batch editing function if the statement or note is not entered at the correct position after performing the merge process. (☞ Section 9.3)

# 9.8 Editing SFC Comments

Q CPU L CPU FX

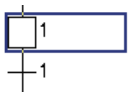
This section explains how to create and edit SFC comments.
SFC comment is a generic term for 'SFC step comments' that are appended to SFC steps, and 'transition comments' that are appended to transitions in the created SFC diagrams.
The following shows the example of entering 'Step comment' at 'Block: 0, SFC step: 1'.
'Transition comment' is not supported by FXCPU.

## Operating procedure

1. **Select [Edit] ⇒ [Documentation] ⇒ [SFC Step/Transition Comment].**

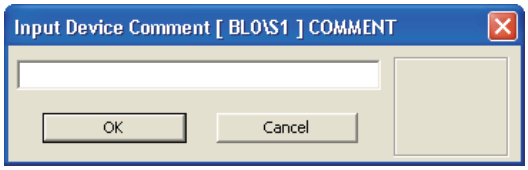
   The editing screen changes to the SFC comment editing mode.

2. **Move the cursor to the position where the SFC comment is entered.**



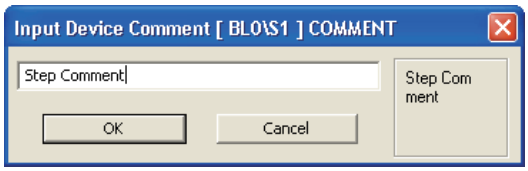

3. **Press the Enter key.**

   The Input Device Comment screen is displayed.



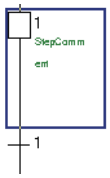

4. **Enter the SFC comment.**

   The line wrapping of the SFC comment display can be checked when the comment is entered.




5. **Click the OK button.**

   The entered SFC step comment is displayed as shown on the right.




### Point

- **Disabling the SFC comment editing mode**
  To disable the SFC comment editing mode, select [Edit] ⇒ [Documentation] ⇒ [SFC Step/Transition Comment] again and uncheck the item.
- **Creating SFC comments**
  SFC comments can be created on the Enter SFC Symbol screen when entering SFC symbols, or by using the device comment editor. When creating SFC comments on the device comment editor, specify the device name as shown below.

| SFC comment | QCPU (Q mode)/LCPU | FXCPU |
|---|---|---|
| SFC step comment | BLm\Sn | Sn |
| Transition comment | BLm\TRn | - |

m: Block number
n: SFC step/transition number

- **Saving SFC comments**
  The created SFC comments are saved in the device comment data.
  To recover SFC comments when reading SFC programs from the programmable controller CPU, write/read device comments to/from the programmable controller CPU.

# 10 CONVERTING/COMPILING PROGRAMS

This chapter explains how to convert/compile created programs.
Programs are converted/compiled to sequence programs that can be executed on the programmable controller CPU.


**10.1 For Projects without Labels . . . . . 10-2**
**10.2 For Projects with Labels . . . . . 10-5**
**10.3 Compilation . . . . . 10-10**
**10.4 Checking for Errors and Warnings . . . . . 10-18**

# 10.1 For Projects without Labels

Q CPU L CPU FX

This section explains how to convert a ladder block created in the project without labels.
The ladder conversion confirms edited content of the ladder block.

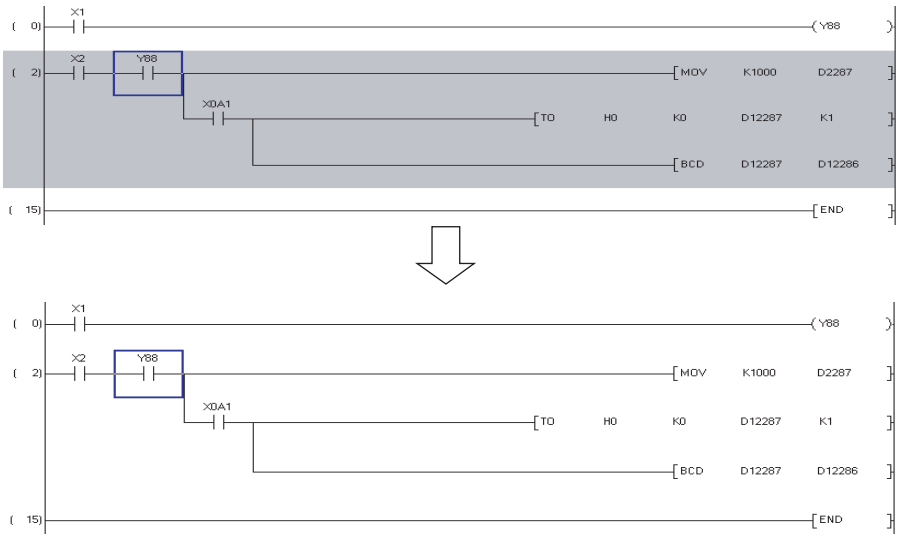
## 10.1.1 Converting created programs

Convert a created program.

### Operating procedure

- Select [Compile] ⇒ [Build] ( ).
  The unconverted ladder block is converted.

Unconverted ladder block is displayed in gray.




## 10.1.2 Converting all programs

Batch-convert all unconverted programs in the project.

### Operating procedure

- Select [Compile] ⇒ [Build All] ( ).
  All unconverted programs are converted.

## 10.1.3 Executing online program change simultaneously with ladder conversion

For the operation for executing the Online program change simultaneously with the ladder conversion, refer to the following manual.

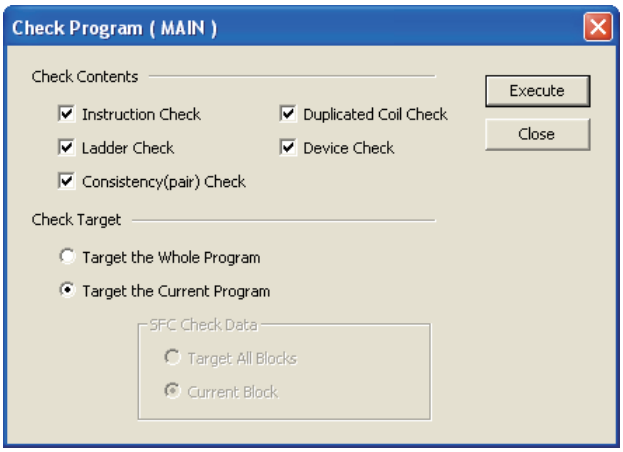
☞ GX Works2 Version 1 Operating Manual (Common)

## 10.1.4 Checking programs

Check errors, such as duplicated coils or device range, in the created programs.
The check result is displayed in the Output window.

### Screen display

Select [Tool] ⇒ [Check Program].




### Operating procedure

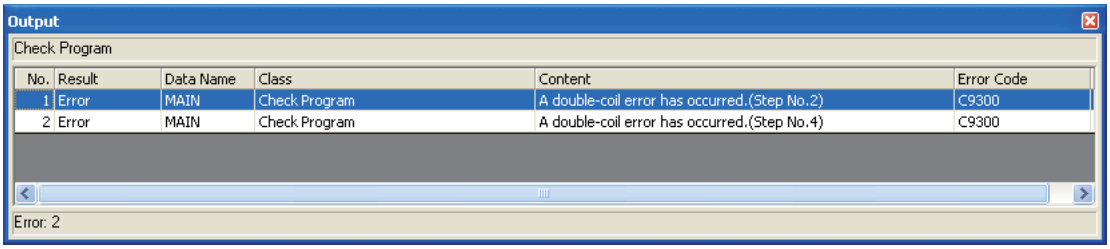
*1.* **Set the items on the screen.**

| item | | | Description |
|---|---|---|---|
| Check | | | Select the item(s) for checking the program.<br>Instruction Check: Check if the instruction can be used for the CPU type of the project being edited.<br>Ladder Check: Check if the ladder is created properly.<br>Consistency (pair) Check: Check the program consistency for such case as no pointer at the jump destination or no RET instruction in the subroutine program.<br>Duplicated Coil Check: Check the duplicated coils.<br>Device Check: Check if the device being used is within the range set in the parameter. |
| Check Target | | | – |
| | Target the Whole Program*1 | | Select this to check all programs in the project. |
| | Target the Current Program | | Select this to check only the program being displayed. |
| | SFC Check Data | | – |
| | | Target All Blocks | Select this to check the SFC block list that includes the SFC blocks being displayed. |
| | | Current Block | Select this to check only SFC blocks being displayed. |

*1: Not supported by FXCPU.

2. **Click the [Execute] button.**

The program is checked and the result is displayed in the Output window.
By double-clicking the result, the corresponding error location in the program is displayed.
For checking errors, refer to Section 10.4.



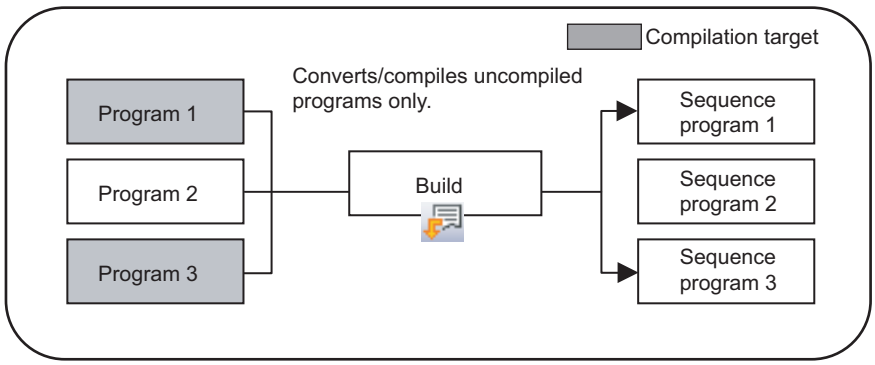
# 10.2 For Projects with Labels

Q CPU L CPU FX

This section explains how to convert/compile the uncompiled programs created in the project with labels.

## 10.2.1 Converting/compiling created programs

Convert/compile a created program.
Since this process compiles only uncompiled programs, the compiling time can be reduced.

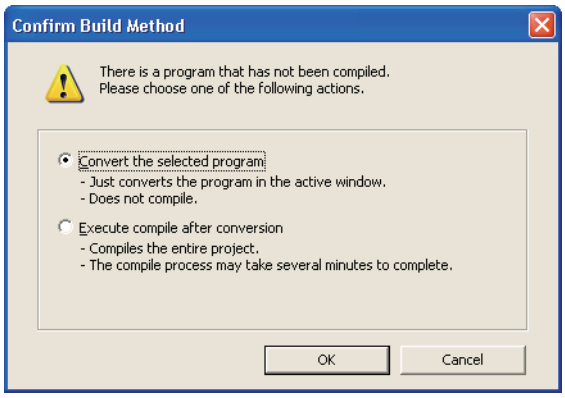



**Point**

● **Conversion and compilation**
The following explains the difference between conversion and compilation.
Conversion: Confirms edited content of ladder/SFC programs.
Compilation: Assigns devices to labels and creates a code to execute the program in a programmable controller CPU.

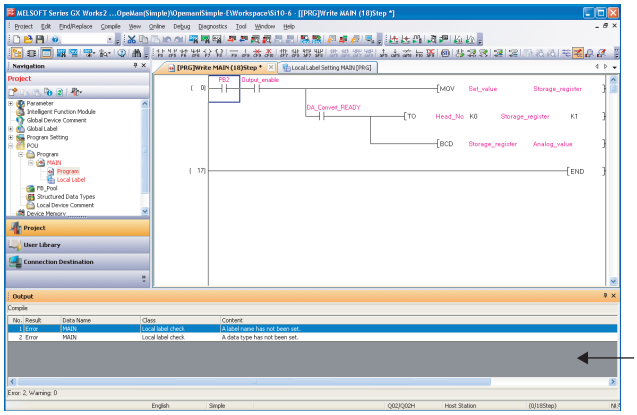
### Operating procedure

1. **Select [Compile] ⇒ [Build] ( ).**
The Confirm Build Method screen is displayed.



## 2. Check the "Execute compile after conversion" item and click the OK button.

Programs are compiled simultaneously with the conversion, and the result is displayed in the Output window.
By double-clicking the result, the corresponding error location in the program is displayed.
For checking errors/warning, refer to Section 10.4.




**Point**

- **Build function**
  Only the program being edited is converted when the "Convert the selected program" is selected on the Confirm Build Method screen.
  The conversion operation is the same as the one for the project without labels. (☞ Section 10.1.1)
  When two or more changes are required in a program, and if "Execute compile after conversion" is selected every time program is changed, processing time is required for each compilation.
  To reduce compilation processing time, select "Convert the selected program" first, and select "Execute compile after conversion" after all changes are made in a program.
- **Compiling programs when adding/changing labels**
  For precautions on compiling programs when adding/changing labels, refer to Section 10.3.3.

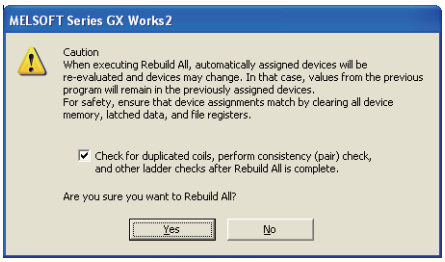
## 10.2.2 Compiling all programs

Batch-convert/-compile all programs in the project.

### Operating procedure

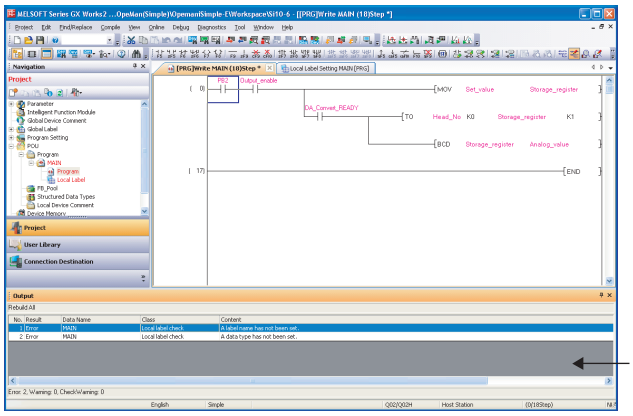
1. **Select [Compile] ⇒ [Rebuild All] ( ).**

   The following message is displayed.
   Uncheck the item if the duplicated coil check, ladder check, and consistency (paring) check are not performed after the compilation.




2. **Click the Yes button after reading and understanding the precaution described on the message.**

   All programs are converted/compiled and the result is displayed in the Output window.
   By double-clicking the result, the corresponding error location in the program is displayed.
   For checking errors/warning, refer to Section 10.4.




**Point**

- **Assigning devices to labels when compiling all programs**
  For assigning devices to labels when compiling all programs, refer to Section 10.3.3.

## 10.2.3 Executing online program change simultaneously with conversion/compilation

For the operation for executing the Online program change simultaneously with the conversion/compilation, refer to the following manual.

☞ GX Works2 Version 1 Operating Manual (Common)

## 10.2.4 Changing operating conditions of compilation

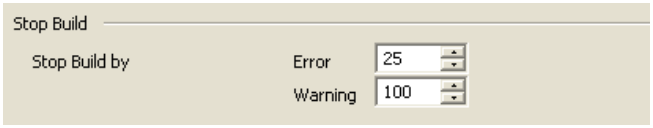
Change the operating conditions of compilation.

### ■ Changing the number of errors and warnings that stops compilation

The number of errors and warnings that stops compilation can be changed.
If the number of errors and warnings that occurred during compilation reaches the specified value, the compilation is aborted.

#### Screen display

Select [Tool] ⇒ [Options] ⇒ "Compile" ⇒ "Output Result".




#### Operating procedure

- Set the items on the screen.

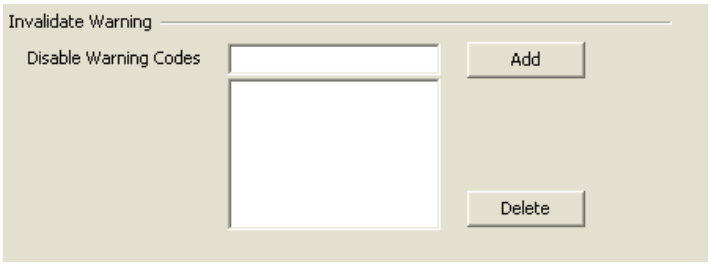
| Item | Description |
|---|---|
| Error | Set the number of errors that stops compilation (1 to 9999). |
| Warning | Set the number of warnings that stops compilation (1 to 9999). |

## ■ Hiding warning messages

Messages displayed in the Output window when compiling programs can be hidden.
The registered warnings are not displayed in the Output window.

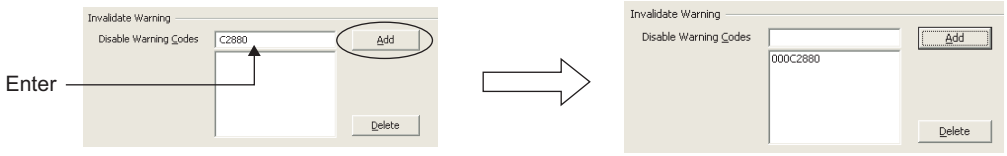
### Screen display

Select [Tool] ⇒ [Options] ⇒ "Compile" ⇒ "Output Result".

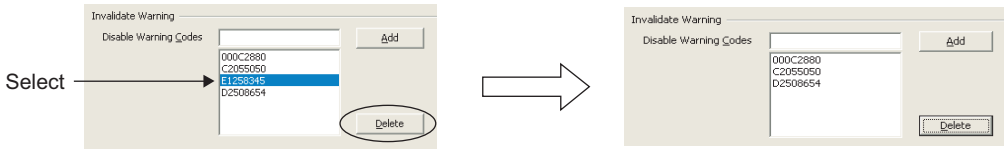



### Operating procedure

- To register the warnings, enter the warning code and click the Add button.
  The registered warnings are not displayed in the Output window.




- To cancel the registration, select the warning code and click the Delete button.
  The unregistered warnings are displayed in the Output window.




**Point**

- **Warning codes**
  Warning codes and their content can be checked in the Output window when compiling programs.
  (☞ Section 10.4)
- **Maximum number of warnings to be invalidated**
  A maximum number of warnings to be invalidated is 100.

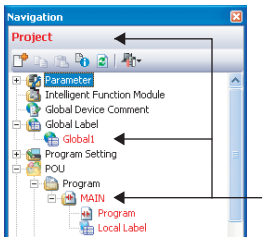
# 10.3 Compilation

Q CPU L CPU FX

By compilation operation, the labels are assigned to devices, and programs created in project with labels are converted to executable programs in a programmable controller CPU.

● Checking the compilation status

The compilation status can be checked in the Project view. Items are displayed in red as shown below if the data are in uncompiled status.
Uncompiled data can be displayed in the Project view by right-clicking on global label/POU/program file, and selecting [Open Uncompiled Data] from the shortcut menu.
Uncompiled data status is displayed on the Project view.




Items are displayed in red if the data are in uncompiled status.

## 10.3.1 Compilation target data when compiling all programs

When compiling all programs, compilation target data are determined according to the registration/usage status of data type.
The following table shows the compilation target data.

○: Compiled, ×: Not compiled

| Compilation target data type | Registration/usage status of compilation target data type | Compilation target when compiling all programs |
|---|---|---|
| Global label data | - | ○ |
| Program (program file) | Registered to any of the following programs.<br>. Initial program<br>. Scan program<br>. Wait program<br>. Fixed interval program<br>. No execution type | ○ |
| Function block | Declared in the label setting editor. | ○ |
| | Not declared in the label setting editor. | × |
| Structure | Declared in the label setting editor. | ○ |
| | Not declared in the label setting editor. | × |

## 10.3.2 Assigning devices

Assign the devices to the labels set on the Device/Label Automatic-Assign Setting screen during compilation.
For details of device assignment when inline structured text or ST is used, and precautions, refer to the following.
☞ GX Works2 Version 1 Operating Manual (Structured Project)

### ■ Assigning devices defined on the label setting editor to the labels

The following explains the device assignment to the labels defined on the label setting editor.
For global labels, only labels whose “Device” is blank on the label setting editor can be assigned.
When both global labels and local labels are assigned, global labels are assigned to devices first, and then local labels are assigned to devices.

● Assigning only one type of device automatically

Assign the devices in top down order on the label setting editor.
Devices are assigned in descending order on the screen (assigned from higher number of a device number) of device range set on the Device/Label Automatic-Assign Setting.
For pointer (P), devices are assigned in ascending order (assigned from lower number of a device number).

Example
<Device automatic-assign setting>
Set the following device range.
• D device: 8000 to 8191

<Label setting>

| | Class | Label Name | Data Type |
|---|---|---|---|
| 1 | VAR | Label_A | Word[Signed] |
| 2 | VAR | Label_B | Word[Signed] |
| 3 | VAR | Label_C | FLOAT (Double Precision) |
| 4 | VAR | Label_D | FLOAT (Double Precision) |

<Devices to be assigned to labels>

| Definition order | Label name | Data type | Example of devices to be assigned | |
|---|---|---|---|---|
| 1 | Label_A | Word (signed) | D8191 | Descending order |
| 2 | Label_B | Word (signed) | D8190 | |
| 3 | Label_C | Double-precision real | D8186 | |
| 4 | Label_D | Double-precision real | D8182 | |

● Assigning multiple types of device automatically (QCPU (Q mode)/LCPU)

Assign the devices in top down order on the label setting editor.
Devices are assigned in descending order (assigned from higher number of a device number) of device range set on the Device/Label Automatic-Assign Setting.
When the number of devices is less than the number of devices required for one label, devices are assigned in descending order of the next device's device range.
When the following label requires the devices which are within the above device range, the previous devices which are not assigned are assigned.

Example 1
<Device automatic-assign setting>
Set the following device range.
• D device: 8000 to 8002
• ZR device: 0 to 1023

<Label setting>

| | Class | Label Name | Data Type |
|---|---|---|---|
| 1 | VAR | Label_A | Word[Signed] |
| 2 | VAR | Label_B | Word[Signed] |
| 3 | VAR | Label_C | FLOAT (Double Precision) |
| 4 | VAR | Label_D | FLOAT (Double Precision) |

<Devices to be assigned to labels>

| Definition order | Label name | Data type | Example of devices to be assigned | |
|---|---|---|---|---|
| 1 | Label_A | Word (signed) | D8002 | Descending order |
| 2 | Label_B | Word (signed) | D8001 | |
| 3 | Label_C | Double-precision real | ZR1020*1 | |
| 4 | Label_D | Double-precision real | ZR1016 | |

*1 : Since double-precision real requires four devices, one device of D8000 is not enough. Therefore, the next device ZR is assigned.

Example 2
<Device automatic-assign setting>
Set the following device range.
• D device: 8000 to 8002
• ZR device: 0 to 1023

<Label setting>

| | Class | Label Name | Data Type |
|---|---|---|---|
| 1 | VAR | Label_A | Word[Signed] |
| 2 | VAR | Label_B | FLOAT (Double Precision) |
| 3 | VAR | Label_C | Word[Signed] |
| 4 | VAR | Label_D | FLOAT (Double Precision) |

<Devices to be assigned to labels>

| Definition order | Label name | Data type | Example of devices to be assigned | |
|---|---|---|---|---|
| 1 | Label_A | Word (signed) | D8002 | Descending order |
| 2 | Label_B | Double-precision real | ZR1020*1 | |
| 3 | Label_C | Word (signed) | D8001*2 | |
| 4 | Label_D | Double-precision real | ZR1016*3 | |

*1 : Double-precision real requires four devices, two device of D8000 to D8001 are not enough. Therefore, the next device ZR is assigned.

*2 : Since word (signed) requires one device, D8001 can be assigned. Therefore, return to the previous device (D device), and the device is assigned to the label.

*3 : Since double-precision real requires four devices, one device of D8000 is not enough. Therefore, the next device ZR is assigned.

## ■ Assigning to temporary variable (automatically assigned device to other than label)

For details of device assignment to temporary variable, and precautions when inline structured text or ST is used, refer to the following.
☞ GX Works2 Version 1 Operating Manual (Structured Project)

## ■ Checking points of the empty automatically assigned device

The usage of devices within the range set on the Device/Label Automatic-Assign Setting can be checked by searching devices within the automatically assigned device range with the Device List.

Example
When 4000 to 8191 of D device are set on the Device/Label Automatic-Assign Setting, search D4000 to D8191 with the Device List.
The range of number of empty device points is the devices before the device numbers being used among D4000 to D8191 (*).
For example, if D5000 is used, D4000 to D4999 are the number of empty device points within the range set on the Device/Label Automatic-Assign Setting.

For details of Device List, refer to the following manual.
☞ GX Works2 Version 1 Operating Manual (Common)

## 10.3.3 Precautions on compilation

● When the multiple types of devices are assigned automatically (QCPU (Q mode)/LCPU)

If a program or label is changed and executed “Build” repeatedly, the number of used device is increased and assignable devices is decreased since the devices assigned once cannot be used. Execute “Rebuild All”.
When D, W, R, ZR are selected as automatically assigned device concurrently, devices are assigned from D, W. If the number of D, W is not enough, devices are assigned from R, ZR.
Note that the control timing may change depending on the program content since the operation processing times of D, W and R differ from that of ZR.
For details of operation processing time, refer to the following manual.
☞ MELSEC-Q/L Structured Programming Manual (Common Instructions)

● When array type labels are used

When devices/labels are used for indexes in array type labels, the compilation result is created with the devices shown below.
Note that the device values may be overwritten when the following devices are used in user programs.
- Basic model QCPU, High Performance model QCPU: Z0, Z1
- Universal model QCPU, LCPU: Z16 to 19
- FXCPU: Z0, V0

● Compiling programs when adding/changing labels

When programs are compiled after adding/changing labels, devices are reassigned to labels in uncompiled POUs only. Since previous device values may remain among the devices reassigned to labels, clear the previous device values by the following procedure when adding/changing labels.

**Operation**

1. Add/change labels only.
   (Do not edit the programs.)
2. Select [Compile] ⇒ [Build], and compile the programs.
3. Register added/changed labels to the Watch window and clear the current values to 0.
4. Edit the programs and select [Compile] ⇒ [Online Program Change].

● Assigning devices to labels when compiling all programs

All programs need to be compiled when the following operations are performed.
- Changing the following PLC parameters[*1]
  - "Common Pointer No." and "Timer Limit Setting" on the <<PLC System>> tab
  - "File Register" and "File for Local Device" on the <<PLC File>> tab
  - Settings on the <<Device>> tab
- Changing the following option settings
  - "Default Length of String Data Type" in "Label Setting Editor"
  - Settings in "Compile"
- Changing automatically assigned devices
- Changing PLC type
- Changing project type
- Reading data from programmable controller CPU (except for when reading symbolic information and parameters at the same time)
- Reading data written to the programmable controller CPU by GX Developer
- Using Open Other Project function

When all programs are compiled, devices are reassigned to labels in all POUs. If all the compiled programs are written to the programmable controller CPU and run as they are, the programs may be processed with the device values set before the program change.
After compiling all programs, clear the device values set before the program change by the following procedure.
Note that, by setting the following option, device values in the range set in the device/label automatic-assign setting can be automatically cleared to 0 after writing programs to the programmable controller CPU.

- [Tool] ⇒ [Options] ⇒ "When writing to PLC after a Rebuild All operation, clear the device ranges set in the Device/Label Auto-Assign setting to 0"

*1 : QCPU (Q mode)/LCPU only

- QCPU (Q mode)/LCPU

**Operation**

1. Switch the programmable controller CPU to STOP.
2. Select [Online] ⇒ [Write to PLC], and write programs to the programmable controller CPU.
3. Switch the programmable controller CPU to RESET.
   It can also be reset by selecting [Compile] ⇒ [Remote Operation].
4. Select [Online] ⇒ [PLC Memory Operation] ⇒ [Clear PLC Memory] to clear the memories.
   If VAR_RETAIN is used in the [Device/Label Automatic-Assign Setting], clear all device memories including latches.
   If file registers are used in the [Device/Label Automatic-Assign Setting], clear all file registers.

- FXCPU

**Operation**

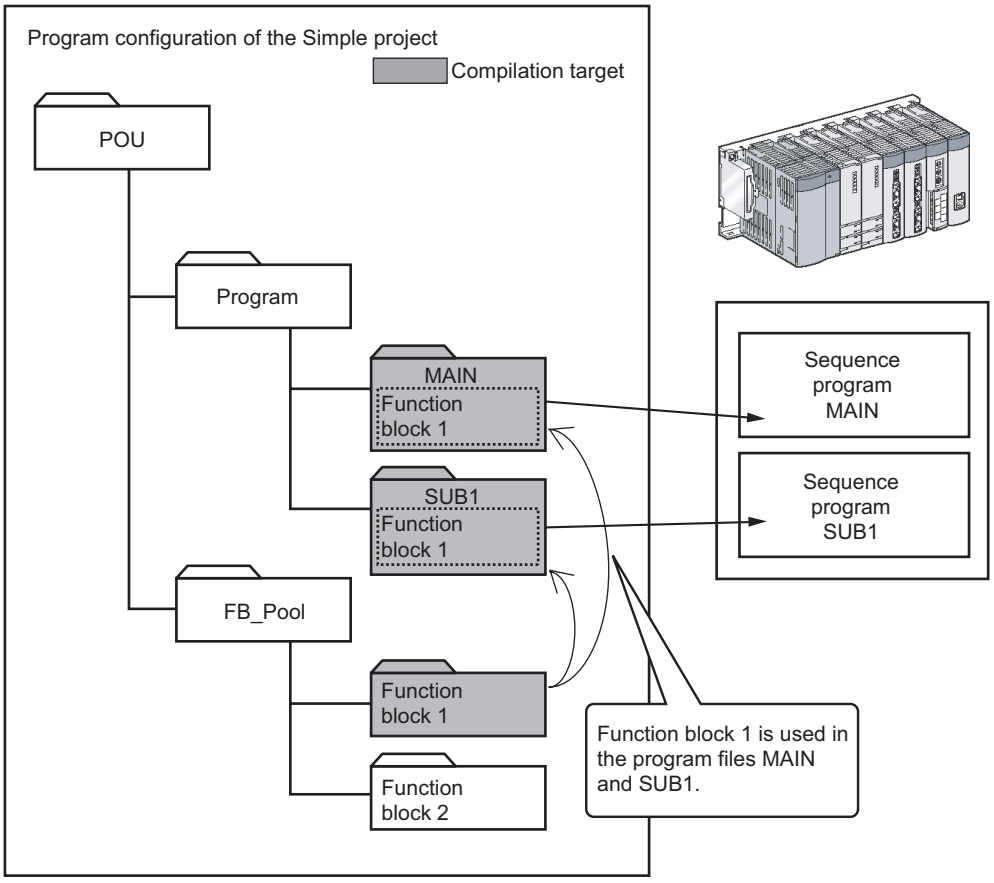
1. Switch the programmable controller CPU to STOP.
2. Select [Online] ⇒ [Write to PLC], and write programs to the programmable controller CPU.
3. Select [Online] ⇒ [PLC Memory Operation] ⇒ [Clear PLC Memory] to clear the device memories.

The remote RUN function when writing data to programmable controller CPU after all the compiled programs can be disabled by setting the following option. Check "Turn PLC to STOP at time of PLC write after executing Rebuild All and do not execute remote RUN" under [Tool] ⇒ [Options] ⇒ [PLC Read/Write].

● Modification of global labels and function blocks

If global labels and/or function blocks are modified, multiple programs become the compilation targets. Write all program files of the compilation targets to the programmable controller CPU to apply the modifications.

Example) Compiling programs after modifying Function block 1 in the following program configuration.
Function block 1 is compiled and the program files MAIN and SUB1 are modified.




● Device/label automatic-assign setting

Devices in the range set on the Device/Label Automatic-Assign Setting screen (automatically assigned devices) cannot be used in the program.
If automatically assigned devices are used in a program, a compilation error occurs.
(For the device/label automatic-assign setting ☞ Section 5.7)

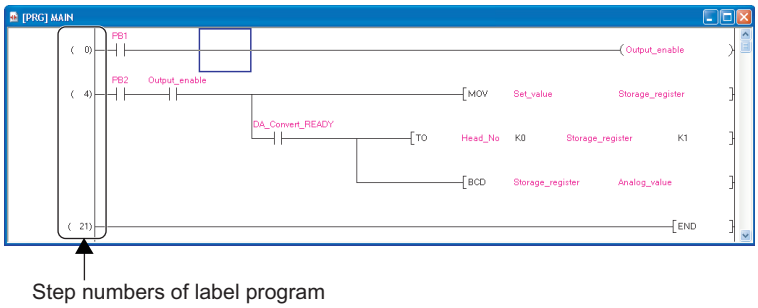
● Input arguments of function block

Data cannot be written to input arguments (VAR_INPUT) of function block.
If data are written to input arguments, a compilation error occurs.

● Step numbers of label program

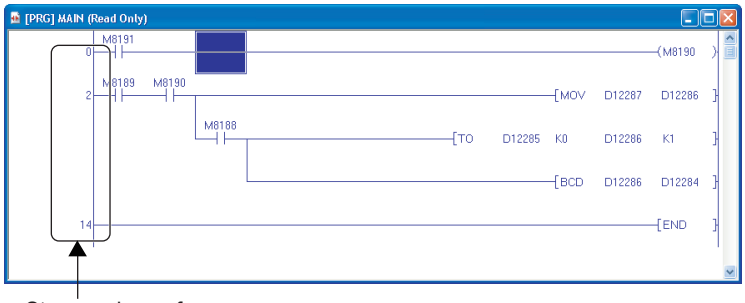
Each step number of the label program is enclosed in parenthesis.
Step numbers may increase/decrease when the program is compiled.
Step numbers actually written to a programmable controller CPU are step numbers displayed in the device display.
When writing the program to a programmable controller CPU, check the step numbers by displaying devices after the compilation.

< Label display >




Step numbers of label program

< Device display >



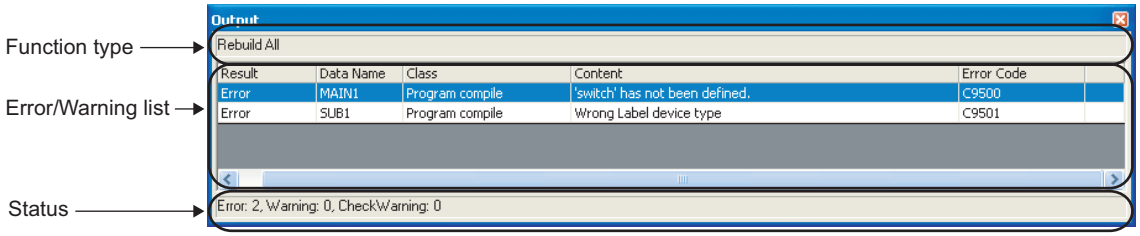

Step numbers of sequence program

# 10.4 Checking for Errors and Warnings

Q CPU L CPU FX

When the program check or the compilation is executed, the target programs and label settings are checked and the results are displayed in the Output window.
The following explains the checking method for errors displayed in the Output window.

## Screen display




## Display contents

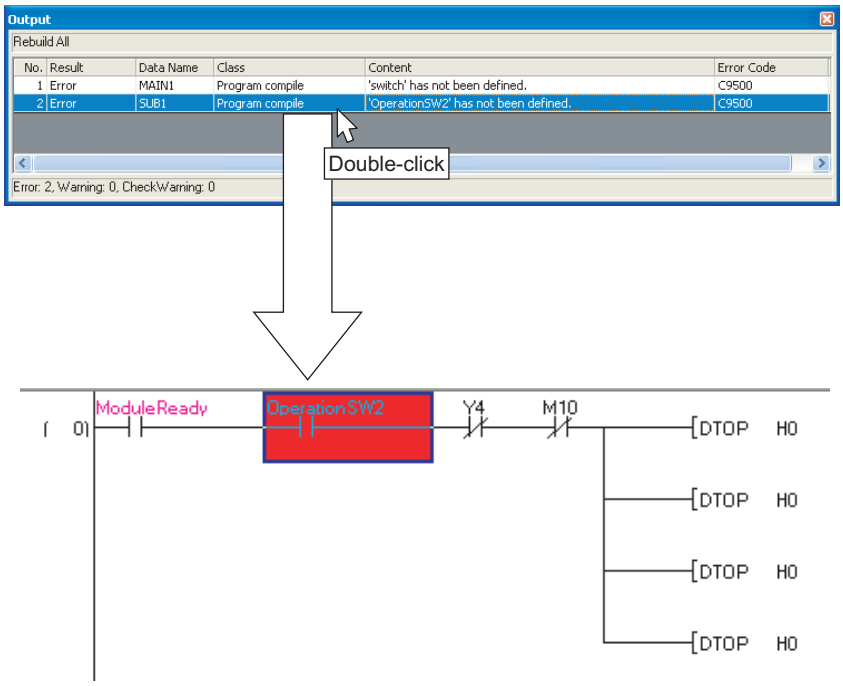
| Item | | Description |
|---|---|---|
| Function type | | Display the name of the executed function. |
| Error/warning list | | - |
| | Result | Display the check results.<br>Display "Error" or "Warning".<br>Display "Check Warning" for the duplicated coil check/ladder check/consistency check warnings. |
| | Data Name | Display project names with errors and warnings. |
| | Class | Display check types such as the compilation and program check. |
| | Content | Display descriptions of errors and warnings. |
| | Error Code | Display error code numbers. |
| Status | | Display the total number of errors and warnings. |

## 10.4.1 Correcting errors and warnings

Check and correct errors/warnings.

### Operating procedure

1. **Double-click the error/warning message displayed in the Output window.**
   The corresponding error location in the program is displayed.




2. **Check the corresponding error location and correct the error as instructed by the error/warning message.**

MEMO

# 11 WRITING/READING DATA TO/ FROM PROGRAMMABLE CONTROLLER CPU

This chapter explains how to write/read sequence programs to/from the programmable controller CPU or memory card.

For the overview of the data write/read operation, refer to the following manual.

☞ GX Works2 Version 1 Operating Manual (Common)

**11.1 Writing/Reading Data to/from Programmable Controller CPU . . . 11-2**

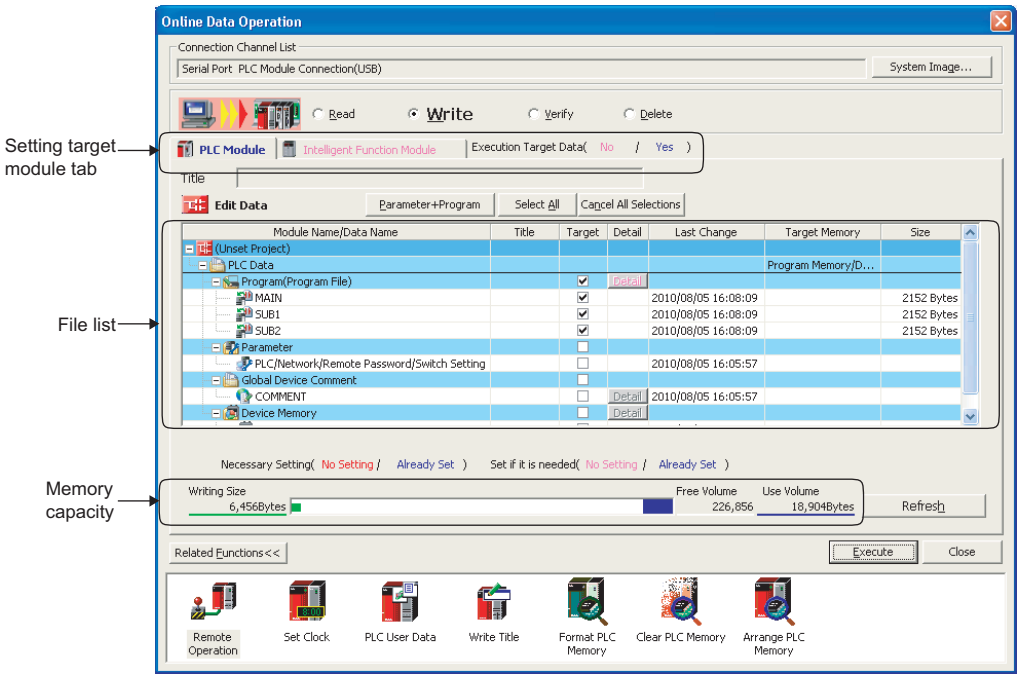
# 11.1 Writing/Reading Data to/from Programmable Controller CPU

Q CPU L CPU FX

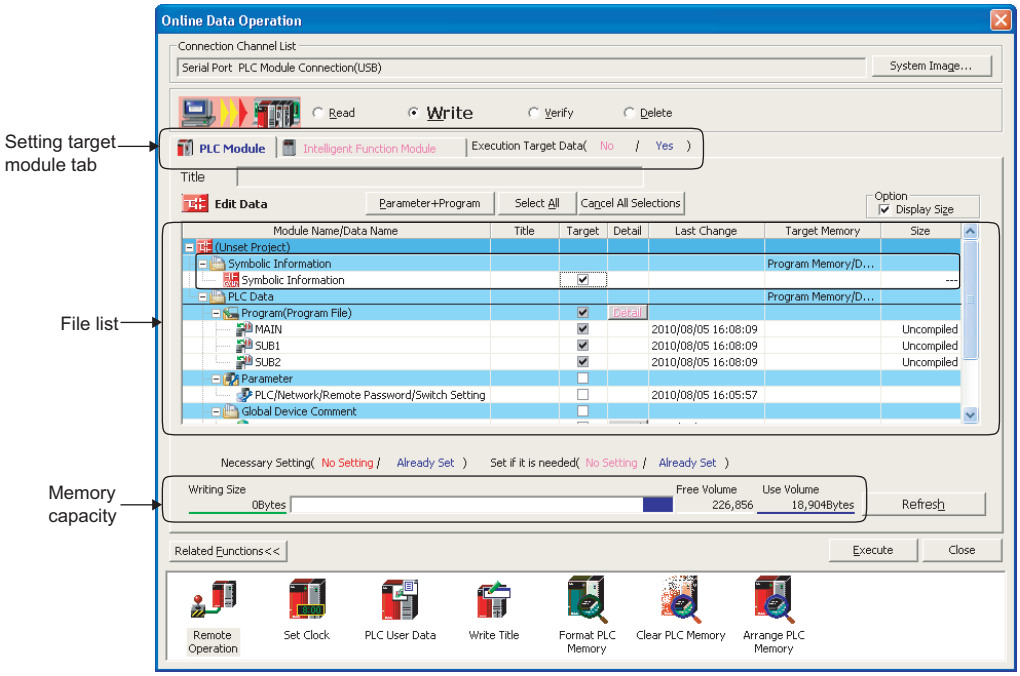
This section explains how to write the Simple project data to the programmable controller CPU or memory card, and how to read the data from the programmable controller CPU or memory card to the project.
Symbolic information can be written to/read from a programmable controller CPU for projects with labels of FX3U/FX3UC version 3.00 or later only.

## Screen display

Select [Online] ⇒ [Write to PLC] ( )/[Read from PLC] ( ).
<Write to PLC screen for the project without labels>




<Write to PLC screen for the project with labels>
For QCPU (Q mode)/LCPU/FXCPU (FX3U/FX3UC version 3.00 or later), symbolic information is displayed on the file list.



## Operating procedure

### 1. Set the items on the screen.

| Item | | | Description |
|---|---|---|---|
| Connection Channel List | | | Display the information on the set connection target. |
| Setting target module tab | | | Switch the setting target module.<br>If the target data of write/read exists, the color of the tab name is displayed in blue. |
| | PLC Module | | Set to write the data to the programmable controller CPU. |
| | Intelligent Function Module*1 | | Set to write the data of the intelligent function module to buffer memory/ flash ROM of the intelligent function module.<br>☞ GX Works2 Version 1 Operating Manual (Common) |
| Title*1 | | | Display the title of the target memory by clicking the Refresh button. |
| Option*2 | | | – |
| | | Display Size | Check this to display "Size" in the file list and the memory capacity. |
| File list | | | – |
| | | Target | Select the data to be written/read. |
| | | Target Memory | Select the memory from the list ( ) by clicking the cell under "Target Memory".<br>For details of the memory card application, refer to the following manual.<br>☞ QCPU User's Manual (Hardware Design, Maintenance and Inspection)<br>☞ MELSEC-L CPU module User's Manual (Hardware Design, Maintenance and Inspection) |
| Memory capacity*3 | | | – |
| | | Writing Size | Display the total size of written data checked in "Target". |
| | | Free Volume | Display the free space volume of the target memory. |
| | | Use Volume | Display the used space volume of the target memory. |

*1: Not supported by FXCPU.

*2: Displayed only when writing data to the programmable controller PLC using a project with labels.

*3: For FXCPU, program size and symbolic information data size are displayed when executing the Write to PLC function. Symbolic information size is displayed on the screen for projects with labels of FX3U/FX3UC version 3.00 or later only.

When a program (program file), device comment, or device memory is selected, the range can be set by clicking the Detail / Detail button.
When reading data from the programmable controller CPU, and the device memory is selected, the detailed settings are required.
For details, refer to the following manual.
☞ GX Works2 Version 1 Operating Manual (Common)

### 2. Click the Execute button.

When the Write to PLC function is executed, the specified data are written to the target memory.
When the Read from PLC function is executed, the specified data are read from the target memory.

## Screen button

- System Image...

  Displays the illustration of the connection channel list.

- Parameter + Program

  Selects the parameters and all programs displayed in the list.

- Select All

  Selects all data displayed in the list.

- Cancel All Selections

  Cancels the selection status of all data displayed in the list.

- Related Functions>> / Related Functions<<

  Switches display/hide of the Related functions button.
  For details of the related functions, refer to the following manual.
  ☞ GX Works2 Version 1 Operating Manual (Common)

- Acquire Symbolic Information Project Name (Read from PLC, Delete PLC Data only)

  Displays the project name of the symbolic information in the Title/Project Name column.
  It is not displayed for projects without labels and FXCPU.

- Refresh

  Updates data list on the Online Data Operation screen.
  For QCPU (Q mode)/LCPU, updates writing size, free space volume, and used space volume.
  When multiple personal computers are connected to the programmable controller CPU, update the target memory before reading data from the programmable controller CPU.

## ■ Symbolic information

The symbolic information is data that store the program configuration such as structures and labels. To restore these data included in the symbolic information when reading a program from the programmable controller CPU, write/read the symbolic information to/from the programmable controller CPU.
Data such as structures and labels included in the symbolic information cannot be restored if only sequence programs are read.

The following table shows the program data included in the symbolic information.

| Item | Included data | |
|---|---|---|
| Symbolic information | Global label | |
| | POU | |
| | | Program |
| | | Local label |
| | | Function block |
| | | Structure |

**Point**

- **Compile status when the symbolic information is read**
  - When the symbolic information and parameters are read simultaneously, and the data in the symbolic information match with parameters and programs (program files) in the programmable controller CPU, the read data are in compiled status.
  - When only the symbolic information is read, the read data are in uncompiled status.
  - When the symbolic information of GX Developer or GX IEC Developer is read, the read data are in uncompiled status. Compile the program again after executing the Read from PLC function.
- **Precautions for reading symbolic information**
  For the precautions for reading label programs (symbolic information) of the existing application using GX Works2, or reading label programs (symbolic information) of GX Works2 using the existing application, refer to the following manual.
  (☞ GX Works2 Version 1 Operating Manual (Common))
- **For FXCPU**
  - Symbolic information can be read from/write to a programmable controller CPU in a project of FX3U/FX3UC version 3.00 or later only.
  - When a memory cassette to which the symbolic information has been written is used on an FXCPU other than FX3U/FX3UC version 3.00 or later, the memory cassette can be used, however, the symbolic information cannot be read from the memory cassette.
    When the symbolic information is written to a memory cassette on an FXCPU other than FX3U/FX3UC version 3.00 or later, the symbolic information may be corrupted.
- **Saving project automatically after writing data to programmable controller CPU**
  A project can be saved automatically after writing data to the programmable controller CPU by setting the option. Check the "Save project after writing to PLC" item under [Tool] ⇒ [Options] ⇒ "Project" ⇒ "Automatic Save".

# MEMO

# 12 MONITORING

This chapter explains how to monitor the program execution status of the programmable controller CPU using the program editor.
For the overview of monitoring, refer to the following manual.
☞ GX Works2 Version 1 Operating Manual (Common)


**12.1 Starting and Stopping Monitoring of Programs . . . . . 12-2**
**12.2 Starting and Stopping Monitoring of Function Blocks . . . 12-3**
**12.3 Changing Operating Conditions of Monitoring . . . . . 12-4**
**12.4 Monitoring Ladder Programs . . . . . 12-7**
**12.5 Monitoring SFC Programs . . . . . 12-8**

# 12.1 Starting and Stopping Monitoring of Programs

Q CPU L CPU FX

This section explains how to monitor a program.
Open the program editor to be monitored in advance.

## ■ Starting monitoring of programs

Start monitoring of the program.

### Operating procedure

- Select [Online] ⇒ [Monitor] ⇒ [Start Monitoring] ( ).
  The monitoring starts.

## ■ Stopping monitoring of programs

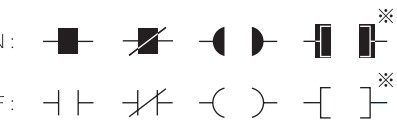
Stop monitoring of the program.

### Operating procedure

- Select [Online] ⇒ [Monitor] ⇒ [Stop Monitoring] ( ).
  The monitoring stops.

### Point

- **Ladder edit mode when option is set**
  When "Use the Switching Ladder Edit Mode (Read, Write, Monitor, Monitor (Write))" has been checked on the option settings, the ladders cannot be edited since the Ladder edit mode becomes 'monitor mode' when Start Monitoring is executed.
  Switch to 'monitor (write mode)' to edit the ladders. (☞ Section 6.1.2)
- **Changing current values**
  During monitoring, bit devices can be forced ON/OFF and the current values of devices, buffer memories, and labels can be changed.
  For forcing bit devices ON/OFF and changing current values, refer to the following manual.
  ☞ GX Works2 Version 1 Operating Manual (Common)
- **ON/OFF status display**
  During monitoring, the ON/OFF status of bit device is displayed as shown on the right.
  *1 Only comparison instructions that are equivalent to contacts, and SET, RST, PLS, PLF, SFT, SFTP, MC, FF, DELTA, and DELTAP instructions that are equivalent to coils are supported.




- **Monitoring buffer memory and link memory**
  To monitor the ON/OFF status of the buffer memory and link memory (example: U0\G0.1), select [Tool] ⇒ [Options] ⇒ "Monitor" ⇒ "Ladder" ⇒ "Operational Setting" and check "Monitor buffer memory and link memory".
- **Monitoring in FX series**
  The GX Works2 display format can be switched to the FXGP(DOS)/FXGP(WIN) display format in FX series. For details of switching the display format, refer to Section 12.3.3.

# 12.2 Starting and Stopping Monitoring of Function Blocks

Q CPU L CPU FX

This section explains how to monitor function block programs.
Open the function block program to be monitored in advance.

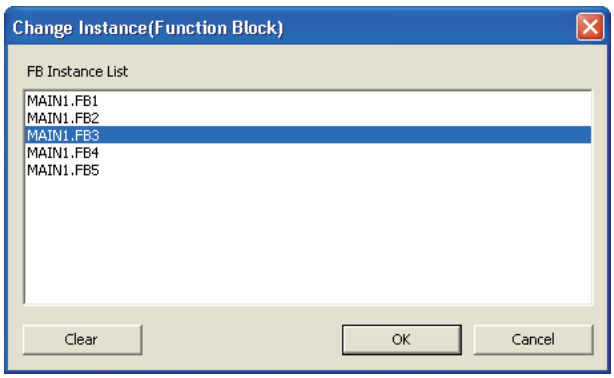
## ■ Starting monitoring of function blocks

Start monitoring of the function block.

### Operating procedure

1. **Select [Online] ⇒ [Monitor] ⇒ [Change Instance (Function Block)].**

   The Change Instance (Function Block) screen is displayed.




2. **Select the FB instance to be monitored.**

3. **Click the OK button.**

4. **Select [Online] ⇒ [Monitor] ⇒ [Start Monitoring] ( ).**

   The monitoring starts.
   The display and executable operations during monitoring are the same as those of the program monitoring. (☞ Section 12.1)

### Screen button

- Clear

  Cancels the selected status of the FB instance and stops monitoring.

## ■ Stopping monitoring of function blocks

Stop monitoring of the function block.

### Operating procedure

- Select [Online] ⇒ [Monitor] ⇒ [Stop Monitoring] ( ).

  The monitoring stops.

# 12.3 Changing Operating Conditions of Monitoring

Q CPU L CPU FX

This section explains how to change the operating conditions of monitoring.

## 12.3.1 Changing current value display format (decimal/ hexadecimal) of word type variable

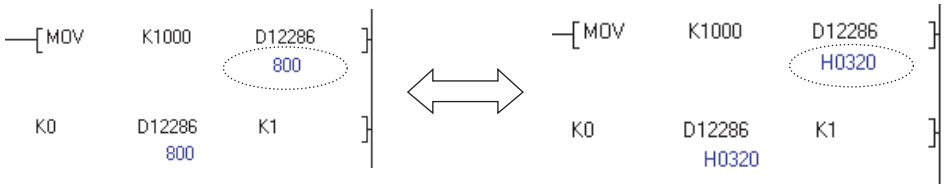
Change the current value display format of word type variable displayed during monitoring.

### ■ Changing display format during monitoring

Change the current value display format of word type variable during monitoring.

#### Operating procedure

- Select [Online] ⇒ [Monitor] ⇒ [Change Value Format (Decimal)] / [Change Value Format (Hexadecimal)].

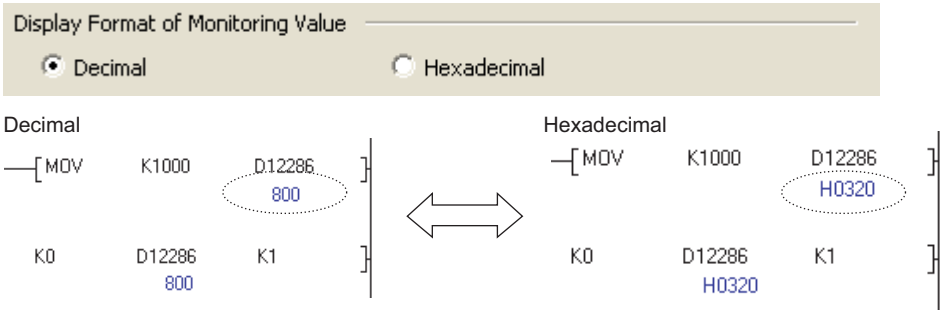



### ■ Changing display format before starting monitoring

Change the current value display format by setting the option.
The monitoring starts with the set display format.

#### Operating procedure

- Select [Tool] ⇒ [Options] ⇒ "Monitor" ⇒ "Ladder" ⇒ "Display Format of Monitoring Value" ⇒ "Decimal"/"Hexadecimal".

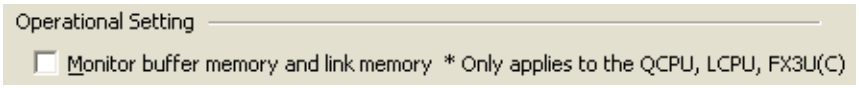


## 12.3.2 Monitoring buffer memory and link memory

Select whether to monitor the buffer memory and link memory at monitoring.
The scan time of the programmable controller CPU can be reduced by not monitoring the buffer memory and link memory.
For FXCPU, this function is supported by FX3U and FX3UC only.

### Operating procedure

- Select [Tool] ⇒ [Options] ⇒ "Monitor" ⇒ "Ladder" ⇒ "Operational Setting", and check or uncheck the "Monitor buffer memory and link memory" item.

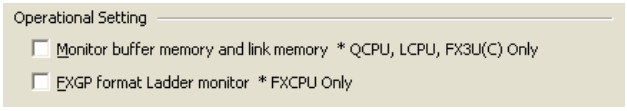


## 12.3.3 Switching to FXGP(DOS)/FXGP(WIN) display format (FXCPU)

Switch the GX Works2 display format to the FXGP(DOS)/FXGP(WIN) display format by setting the option.
As either display is selected, it does not influence the actual FXCPU operations.

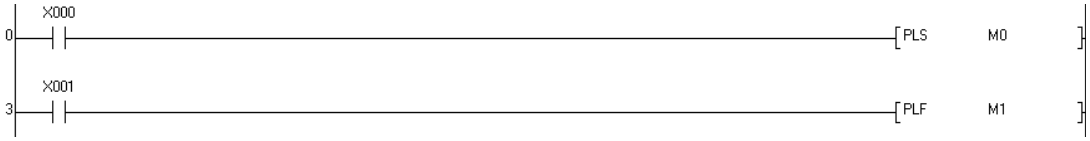
### Operating procedure

- Select [Tool] ⇒ [Options] ⇒ "Monitor" ⇒ "Ladder".



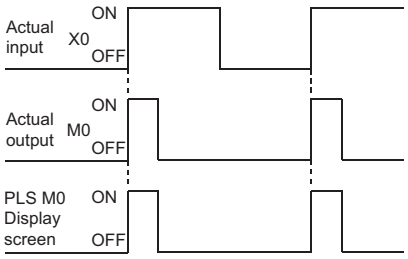

### ■ Comparing monitor display

Example)

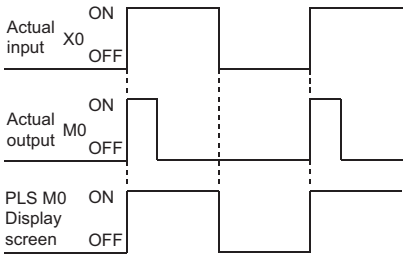



<Monitor display for the PLS instruction>

・GX Works2 format display

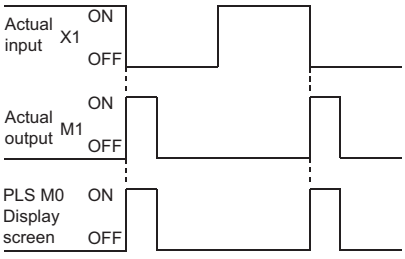



・FXGP(DOS), FXGP(WIN) format display

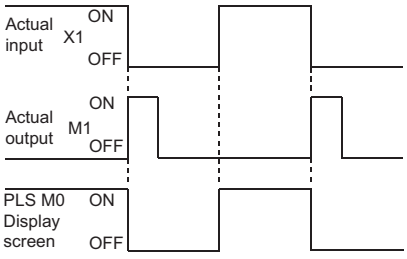



<Monitor display for the PLF instruction>

・GX Works2 format display




・FXGP(DOS), FXGP(WIN) format display



# 12.4 Monitoring Ladder Programs

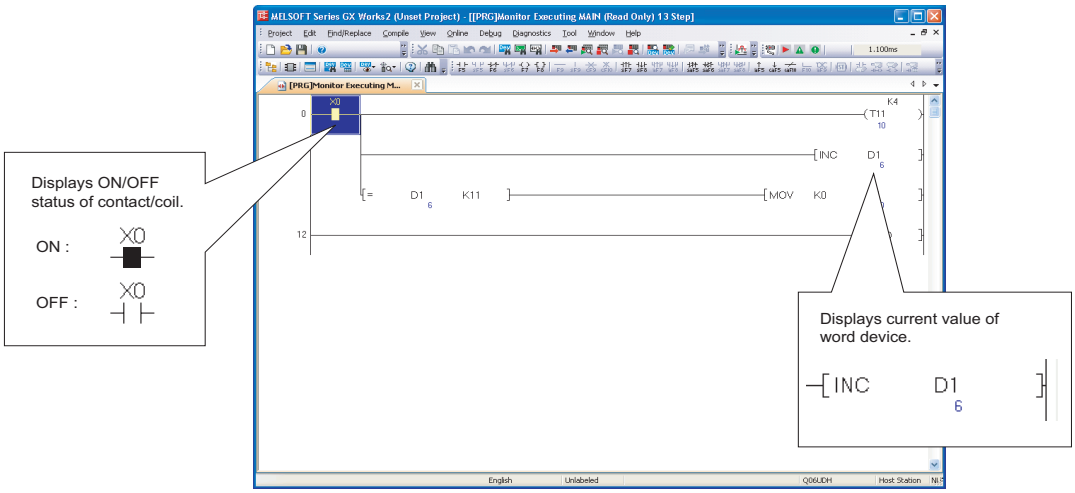
Q CPU L CPU FX

This section explains how to monitor a ladder program.
Open the program editor to be monitored in advance.

## Operating procedure

- Select [Online] ⇒ [Monitor] ⇒ [Start Monitoring] ( ).

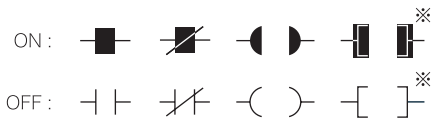
  The monitoring starts.




### Point

● **ON/OFF status display**

During monitoring, the ON/OFF status of bit device is displayed as shown on the right.

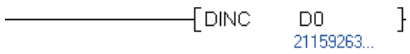



*1: Only comparison instructions that are equivalent to contacts, and SET, RST, PLS, PLF, SFT, SFTP, MC, FF, DELTA, and DELTAP instructions that are equivalent to coils are supported.

● **Word device monitor values**

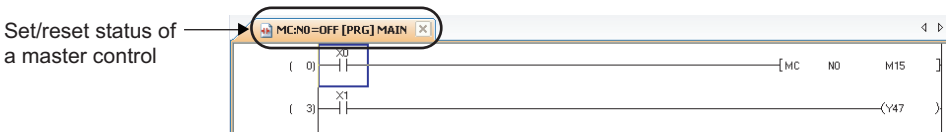
When the current value is a large value, "..." is appended to the value as shown below to omit the following numbers.
The omitted numbers can be checked by any of the following operations.

- Place the cursor on the monitor value, and display the tool hint.
- Select [View] ⇒ [Zoom].
- Select [View] ⇒ [Text Size] ⇒ [Smaller]. (Hold the Ctrl key and rotate the mouse middle scroll button backward)




● **Monitor display at use of master control instructions**

In GX Works2, the set/reset status of a master control is not displayed on a left power rail of a ladder program during monitoring.
It is displayed on a title bar of a tab.



# 12.5 Monitoring SFC Programs

This section explains how to monitor SFC diagrams and SFC block list of SFC program.
Open the program editor to be monitored in advance.
The monitoring of the Zoom editor window is same as monitoring of ladder programs. (☞ Section 12.4)

## 12.5.1 Monitoring SFC diagrams

Q CPU L CPU FX

Monitor active steps, inactive steps, and steps being on hold on the SFC diagram.

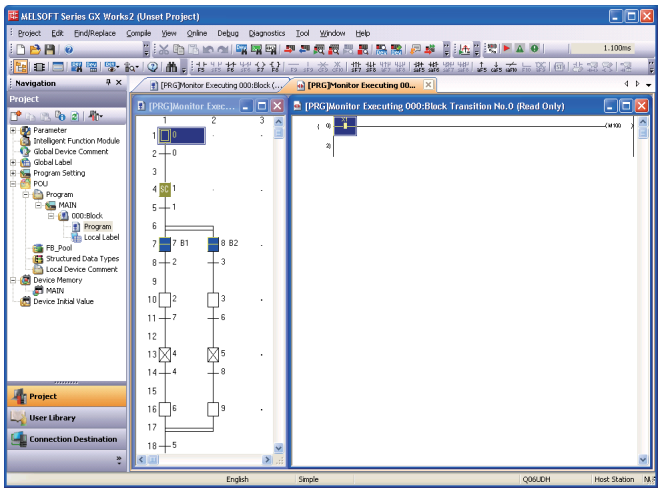
### ■ Starting monitoring of the SFC diagram

Start monitoring of the SFC diagram.

#### Operating procedure

- Select [Online] ⇒ [Monitor] ⇒ [Start Monitoring] ( ).

  The monitoring starts.




#### Display contents

| | Description |
|---|---|
| (Blue) | Active step |
| (White) | Inactive step |
| (Yellow)*1 | A step specified as a hold step and being on hold. |

*1: Not supported by FXCPU.

**Point**

● **Monitoring devices in MELSAP-L**
Use the Watch windows to monitor devices in MELSAP-L.
For the method to monitor devices registered in the Watch windows, refer to the following manual.
☞ GX Works2 Version 1 Operating Manual (Common)

## ■ Displaying start destination blocks

Display the start destination block when there is a block start step on the SFC diagram being monitored.

### Operating procedure

- Move the cursor to the block start step, and select [View] ⇒ [Open Zoom/Start Destination Block].
  The start destination block is displayed.

**Point**

● **Another method for displaying start destination blocks**
A start destination block can be also displayed by double-clicking the block start step while pressing the Ctrl key.

## ■ Auto scroll monitoring

Scroll the screen to display active steps automatically when they are out of the screen during monitoring.

### Operating procedure

1. **Select [Online] ⇒ [Monitor] ⇒ [SFC Auto Scroll] ( ).**

2. **Select [Online] ⇒ [Monitor] ⇒ [Start Monitoring] ( ).**
   While the auto scroll monitor function is activated, active steps are scrolled on to the screen automatically when they are out of the screen.

Point

- **Starting method for the auto scroll monitor function**

  The auto scroll monitor function also can be started by selecting [Online] ⇒ [Monitor] ⇒ [SFC Auto Scroll] ( ) during monitoring.

- **When the auto scroll monitor function is disabled**

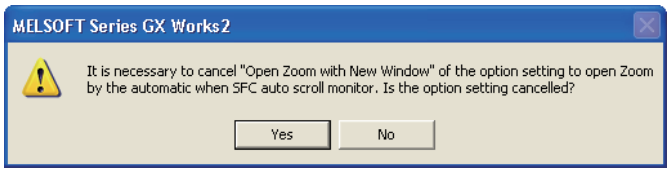
  When [Start Monitoring (All Windows)] is selected while the auto scroll monitor function is being activated, the setting of the auto scroll monitor function is disabled and a normal monitoring starts.

- **When multiple steps are active in series**

  For multiple active steps in series caused by the stored operation steps, active steps close to initial steps are displayed when the auto scroll monitor function is activated.

- **Operations when setting options**

  When the "Open Zoom with New Window" item is checked under [Tool] ⇒ [Options] ⇒ "Program Editor" ⇒ "SFC" ⇒ "Zoom", and the auto scroll monitor function is executed, the following message is displayed. If "Yes" is selected, the SFC diagram and the Zoom editor window are synchronized, and the operation output/transition condition programs that correspond to the active steps are monitored automatically. If "No" is selected, only the SFC diagram is monitored.
  Note that the program cannot be edited on the Zoom editor window that is displayed when the auto scroll monitor function is activated.




- **Displaying a start destination block and starting monitoring during the auto scroll monitoring.**

  For QCPU (Q mode)/LCPU, when the active step is moved to the start destination block during the auto scroll monitoring, the SFC editor of the start destination block can be opened and monitored automatically by checking the "Monitor block start with new window" item under [Tool] ⇒ [Options] ⇒ "Monitor" ⇒ "SFC" ⇒ "SFC Auto Scroll Setting".

## 12.5.2 Monitoring transitions

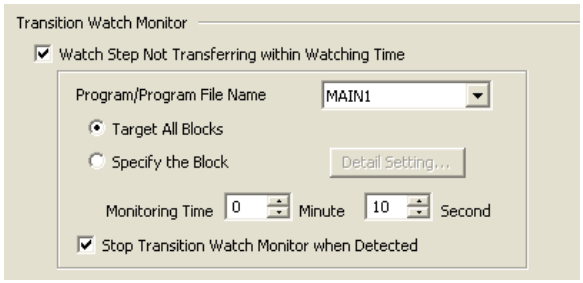
Q CPU L CPU FX

Monitor SFC steps that do not transfer after passing the specified time using the transition monitoring function.

### Operating procedure

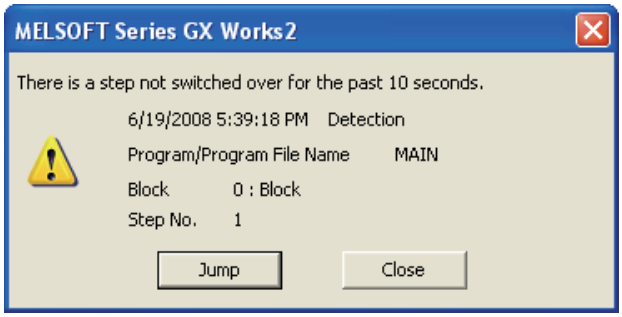
1. **Select [Tool] ⇒ [Options] ⇒ "Monitor" ⇒ "SFC", and set the items in the "Transition Watch Monitor".**

   For details of the setting items, refer to Section 13.2.




2. **Select [Online] ⇒ [Monitor] ⇒ [Start Monitoring] ( ).**

   While the transition monitoring function is activated, the following warning message is displayed when a SFC step that does not transfer after passing the specified time is detected.
   Note that the display of the warning message may be delayed from the specified time depending on the operating system of the personal computer.




- The corresponding SFC step on the SFC diagram is displayed by clicking the Jump button.
- When the "Stop Transition Watch Monitor when Detected" item is checked in the "Transition Watch Monitor" setting, the transition monitoring function is stopped by the detection of an error step, but the normal monitoring continues operating.

## 12.5.3 Monitoring operation outputs and transition conditions

Q CPU L CPU FX

Monitor operation outputs/transition conditions of SFC steps/transitions on the Zoom editor window.

### Operating procedure

1. **Select [View] ⇒ [Open Zoom/Start Destination Block].**
   The Zoom editor window is displayed.
2. **Select [Online] ⇒ [Monitor] ⇒ [Start Monitoring] ( ).**
   The monitoring starts.
   For details of the monitoring, refer to Section 12.4.

## 12.5.4 Batch monitoring all blocks, monitoring active steps

Q CPU L CPU FX

Monitor the active/inactive status of all blocks and step active/inactive status of the specified block in the list display during the execution of the SFC program.

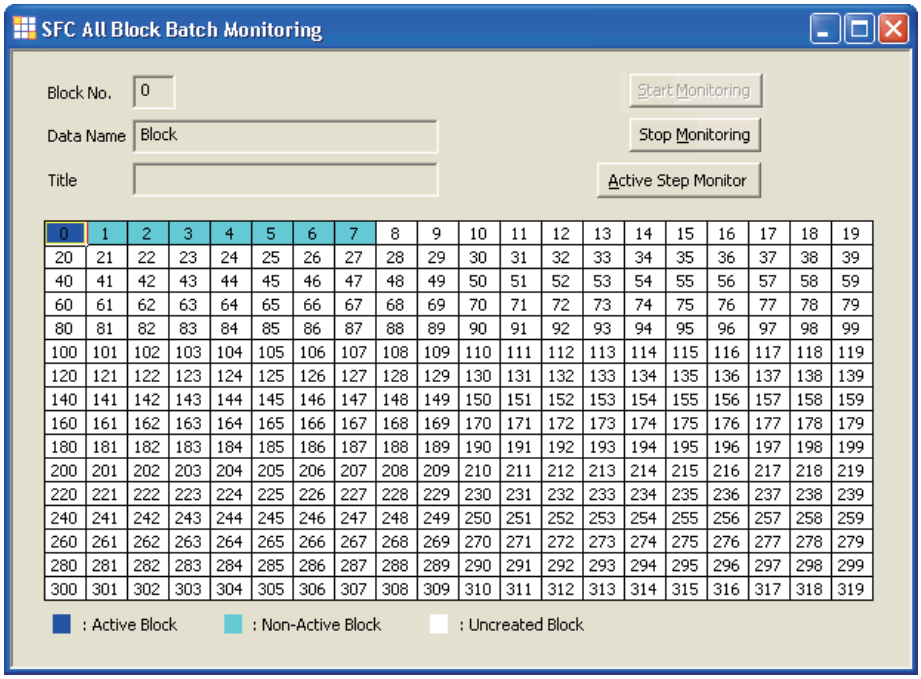
### ■ Batch monitoring all blocks

Monitor the active/inactive status of all blocks in the list display.

#### Operating procedure

- Select [Online] ⇒ [Monitor] ⇒ [SFC All Block Batch Monitoring] ( ).

  The SFC All Block Batch Monitoring screen is displayed.




#### Display contents

| Item | Description |
|---|---|
| Block No. | Display the block number at the cursor position. |
| Data Name | Display the data name of the block. |
| Title | Display the title of the block. |

#### Screen button

- Active Step Monitor

  Monitors the SFC step active/inactive status of the specified block.

  ☞ Monitoring SFC step active/inactive status of the specified block

## ■ Monitoring SFC step active/inactive status of the specified block

Monitor the SFC step active/inactive status in the list display.

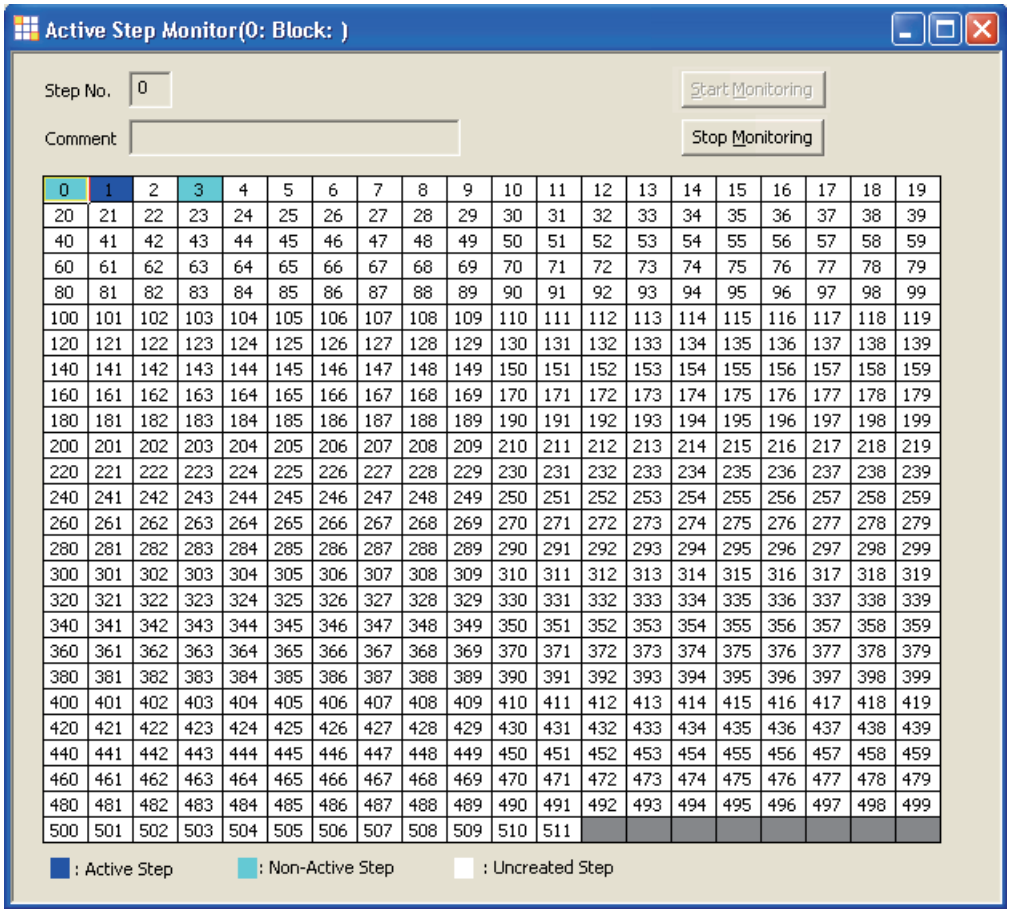
### Operating procedure

- Place the cursor at the block to be monitored on the SFC All Block Batch Monitoring screen, and click the [Active Step Monitor] button.

  The Active Step Monitor screen is displayed.

  If the program is monitored with the programmable controller CPU that is never set to RUN after its reset, all SFC steps are displayed as uncreated steps.

  If the program is monitored with the programmable controller CPU set to STOP, the status at the STOP setting is displayed as the monitoring result.




| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 |
| 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 |
| 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 |
| 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 |
| 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 |
| 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 |
| 140 | 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 154 | 155 | 156 | 157 | 158 | 159 |
| 160 | 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 | 169 | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 |
| 180 | 181 | 182 | 183 | 184 | 185 | 186 | 187 | 188 | 189 | 190 | 191 | 192 | 193 | 194 | 195 | 196 | 197 | 198 | 199 |
| 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 | 208 | 209 | 210 | 211 | 212 | 213 | 214 | 215 | 216 | 217 | 218 | 219 |
| 220 | 221 | 222 | 223 | 224 | 225 | 226 | 227 | 228 | 229 | 230 | 231 | 232 | 233 | 234 | 235 | 236 | 237 | 238 | 239 |
| 240 | 241 | 242 | 243 | 244 | 245 | 246 | 247 | 248 | 249 | 250 | 251 | 252 | 253 | 254 | 255 | 256 | 257 | 258 | 259 |
| 260 | 261 | 262 | 263 | 264 | 265 | 266 | 267 | 268 | 269 | 270 | 271 | 272 | 273 | 274 | 275 | 276 | 277 | 278 | 279 |
| 280 | 281 | 282 | 283 | 284 | 285 | 286 | 287 | 288 | 289 | 290 | 291 | 292 | 293 | 294 | 295 | 296 | 297 | 298 | 299 |
| 300 | 301 | 302 | 303 | 304 | 305 | 306 | 307 | 308 | 309 | 310 | 311 | 312 | 313 | 314 | 315 | 316 | 317 | 318 | 319 |
| 320 | 321 | 322 | 323 | 324 | 325 | 326 | 327 | 328 | 329 | 330 | 331 | 332 | 333 | 334 | 335 | 336 | 337 | 338 | 339 |
| 340 | 341 | 342 | 343 | 344 | 345 | 346 | 347 | 348 | 349 | 350 | 351 | 352 | 353 | 354 | 355 | 356 | 357 | 358 | 359 |
| 360 | 361 | 362 | 363 | 364 | 365 | 366 | 367 | 368 | 369 | 370 | 371 | 372 | 373 | 374 | 375 | 376 | 377 | 378 | 379 |
| 380 | 381 | 382 | 383 | 384 | 385 | 386 | 387 | 388 | 389 | 390 | 391 | 392 | 393 | 394 | 395 | 396 | 397 | 398 | 399 |
| 400 | 401 | 402 | 403 | 404 | 405 | 406 | 407 | 408 | 409 | 410 | 411 | 412 | 413 | 414 | 415 | 416 | 417 | 418 | 419 |
| 420 | 421 | 422 | 423 | 424 | 425 | 426 | 427 | 428 | 429 | 430 | 431 | 432 | 433 | 434 | 435 | 436 | 437 | 438 | 439 |
| 440 | 441 | 442 | 443 | 444 | 445 | 446 | 447 | 448 | 449 | 450 | 451 | 452 | 453 | 454 | 455 | 456 | 457 | 458 | 459 |
| 460 | 461 | 462 | 463 | 464 | 465 | 466 | 467 | 468 | 469 | 470 | 471 | 472 | 473 | 474 | 475 | 476 | 477 | 478 | 479 |
| 480 | 481 | 482 | 483 | 484 | 485 | 486 | 487 | 488 | 489 | 490 | 491 | 492 | 493 | 494 | 495 | 496 | 497 | 498 | 499 |
| 500 | 501 | 502 | 503 | 504 | 505 | 506 | 507 | 508 | 509 | 510 | 511 | | | | | | | | |

## 12.5.5 Monitoring SFC block list

Q CPU L CPU FX

Monitor a SFC block list.

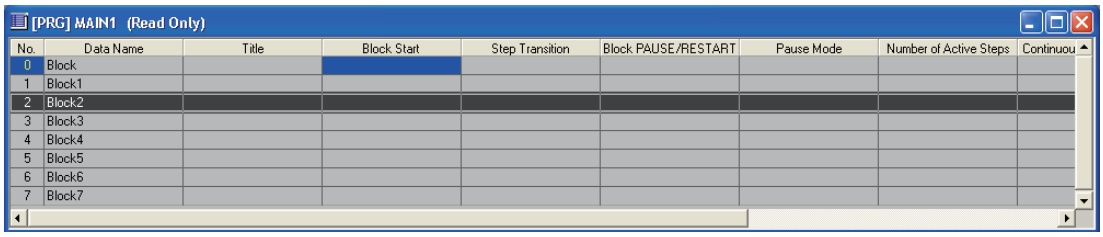
### Operating procedure

1. **Select [View] ⇒ [Open SFC Blocklist].**

   The SFC block list is displayed.

2. **Select [Online] ⇒ [Monitor] ⇒ [Start Monitoring] ( ).**

   The columns of the active block are displayed in blue.
   When the block information is set, the ON/OFF status of the block information device/label can be checked on the SFC block list.
   When the block information is not set, the program is not monitored.
   By double-clicking the block column during monitoring, the SFC diagram of the specified block is displayed.



MEMO

# 13 SETTING OPTIONS

This chapter explains the functions of options for setting screen display format or detailed operations of each function.


**13.1 Basic Operations . . . . . 13-2**
**13.2 Option Setting List . . . . . 13-3**

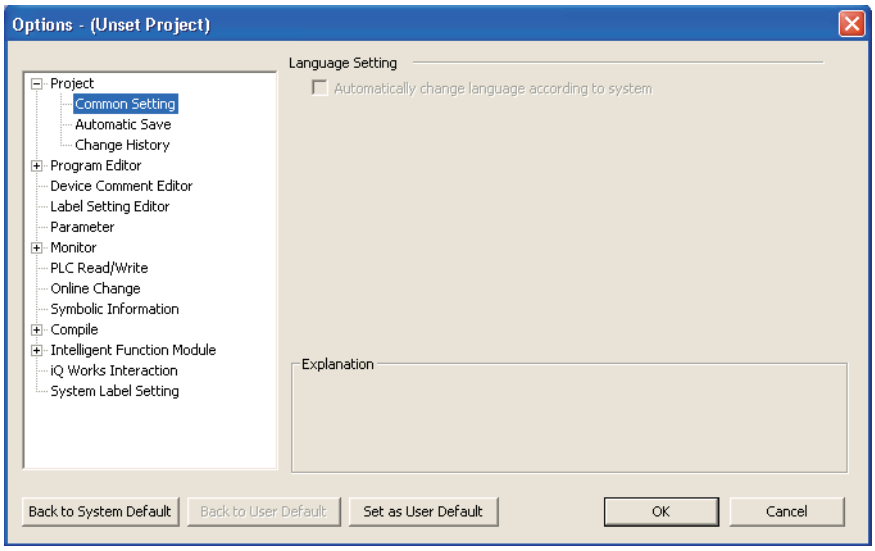
# 13.1 Basic Operations

Q CPU L CPU FX

This section explains how to set options.

## Screen display

Select [Tool] ⇒ [Options].




## Operating procedure

- **Set the items on the screen.**

  When the cursor is placed on a setting item, an explanation of the item is displayed on the "Explanation" field.

  Details of the setting items ☞ Section 13.2

## Screen button

- Back to System Default

  Restores the initial settings.

- Back to User Default

  Restores the user default settings.

- Set as User Default

  Stores the current settings as the user default and applies them to a new project.

# 13.2 Option Setting List

Q CPU L CPU FX

The following table shows the option setting items.

| Tree item | | | Item | Description | Reference |
|---|---|---|---|---|---|
| Project | | | ☞ GX Works2 Version 1 Operating Manual (Common) | | |
| Program Editor | Structured Ladder/FBD | Tool Hint | ☞ GX Works2 Version 1 Operating Manual (Structured Project) | | |
| | | Label | | | |
| | | FB/FUN | | | |
| | | Guided | | | |
| | Ladder/SFC | Device | ☞ GX Works2 Version 1 Operating Manual (Common) | | |
| | | Comment | | | |
| | Ladder | Comment | Device Comment | Select whether to display the label comment or the device comment at ladder editor. | Section 2.2.4 |
| | | | Note | Select whether to display the note comment at ladder editor. | |
| | | | Statement | Select whether to display the statement comment at ladder editor. | |
| | | | Device Comment Display Format | Set the display rows and columns for label comment or device comment. | Section 2.2.6 |
| | | Ladder Diagram | Display Connection of Ladder Diagram | Set the number of contacts to be displayed. | Section 2.2.7 |
| | | | Display STL instruction in contact format *FXCPU Only | Select whether to display STL instruction in contact format. This is valid for simple projects (Not using labels) only. Contact format ladder block display for STL instruction is not wrap displayed. | Section 2.2.10 |
| | | | Use the Switching Ladder Edit Mode (Read, Write, Monitor, Monitor (Write)) | Select whether to switch Ladder Edit Mode (Read, Write, Monitor and Monitor (Write)). Will be the same operation as the ladder edit mode of GX Developer. *Unable to set when security setting is enabled. | Section 6.1.2 |
| | | | Display Instruction Help at symbol error occurrence | Select whether to automatically display Instruction Help when symbol errors occur. | Section 6.2.2 |
| | | | Open Undefined Label Registration dialog at ladder entry | Select whether to open Undefined Label Registration dialog when labels used at ladder entry are undefined. | Section 6.2.1 |
| | | | Set initial value to '1' for Enter HLine/Delete HLine dialogue. | Select whether to set initial value to '1' when Enter HLine/Delete HLine dialog is opened. | Section 6.6.2 |
| | | | Stop at the connection points (Instruction/ Vertical Line) when enter or delete horizontal line. | Select whether to edit line by connection point (Instruction/Vertical Line) when Enter HLine/Delete HLine is executed. | |
| | ST*1 | | Tool Hint Display Items | Select items displayed on tool hint. | (Structured) |
| | | | Tool Hint Display Format | Select display lines on tool hint. | |
| | | | Auto Indention | Select whether to use the automatic indent when beginning a new line after entering ST control syntax such as IF or FOR, and when displaying template of inline structured text. | |
| | | | Instruction/label name prediction | Select whether to display listed label names starting with the input character when a character is input. (Structured text: label name, inline structured text: instruction and label name) | |
| | | | Tabulator Length | Set tab length. It is not available with inline structured text. | |

| Option tree item | | | Item | | Description | Reference |
|---|---|---|---|---|---|---|
| Program Editor | SFC | Comment | Block List | | Display device comment on SFC block list. | Section 7.11 |
| | | | Step/Transition | | Display step/transition comment on SFC editor. | Section 2.3.4 |
| | | SFC Diagram | SFC Edit Area | | Set SFC edit area when create SFC. Please change by "SFC Row Setting" after creating a SFC. | Section 2.3.5 |
| | | | Tile SFC and Zoom vertically | | Select whether to tile Zoom windows at the cursor position on SFC when opening SFC diagram window. Checking this option changes the "Open Zoom with New Window" option into unchecked. | Section 7.9 |
| | | | | Arrange | Select the type of tile for SFC and ZOOM window. | |
| | | | | SFC Display Window Ratio | Select window display ratio for SFC when Tile Vertically is selected. | |
| | | | MELSAP-L label/device Display Format | | Set display lines for MELSAP-L program. | |
| | | | Jump to start destination block | | Set whether to jump to start destination block when cursor is moved to block start step. | |
| | | Zoom | Open Zoom with New Window | | Select whether to open a new window for each Zoom or to change the display in the fixed window when opening Zoom. Checking this option changes the "Tile SFC and Zoom vertically" option into unchecked. | |
| Device Comment Editor | | | ☞ GX Works2 Version 1 Operating Manual (Common) | | | |
| Label Setting Editor | | | Automatic copy and increment when inserting a row | | Select whether to copy the texts in the upper row after incrementing it when inserting a row. | Section 5.5.4 |
| | | | Copy data type/comment items | | Select if the data type, comment, and remark shall be object for auto copy. | |
| | | | Default Length of String Data Type | | Set the default string length for string data type. | Section 5.5.3 |
| Parameter | | | ☞ GX Works2 Version 1 Operating Manual (Common) | | | |
| Monitor | Structured Ladder/FBD/ ST*1 | | ☞ GX Works2 Version 1 Operating Manual (Structured Project) | | | |
| | Ladder | | Display Format of Monitoring Value | | Select the display format of the monitored value in decimal or hexadecimal. | Section 12.3.1 |
| | | | Monitor buffer memory and link memory * Only applies to the QCPU, LCPU, FX3U(C) | | Select whether to monitor buffer memory and link memory during Ladder-monitoring. Scan time of PLC will be lengthened depending on the setting. | Section 12.3.2 |
| | | | FXGP format Ladder monitor * Only applies to the FXCPU | | PLS/PLF instruction is displayed in GP(DOS) and FXGP(WIN) formats. If it is not checked, it is displayed in GX Developer form. | Section 12.3.3 |
| | | | Display lines for monitoring current value | | Select whether to display rows of the current value monitor during Ladder-monitoring. | Section 12.3.3 |
| | | | Set automatic registration destination | | Ladder block label or device contained in cursor will be registered to watch window in automatic registration destination while monitoring watch window. (Caution1:Cursor move will be slow when setting is enabled. 2:Select FB instance for function block.) | (Common) |
| | ST*1 | | Display Format of Monitoring Value | | Select whether to display monitored value in Decimal or Hexadecimal. | (Structured) |
| | | | Monitor buffer memory and link memory *QCPU, LCPU, FX3U(C) only | | Select whether to monitor buffer memory and link memory during monitoring. Scan time of PLC will be lengthened depending on the setting. | |
| | | | Character String Monitor Setting | | Set the number of displayable characters to monitor character-string data. | |

| Option tree item | | | Item | Description | Reference |
|---|---|---|---|---|---|
| Monitor | SFC*1 | | Watch Step Not Transferring within Watching Time | Select whether to display a warning dialog when detect a step that does not transfer even if specified time passes while monitoring. | Section 12.5.2 |
| | | | Program/Program File Name | Select watch target program/program file. | |
| | | | Target All Blocks | Specify watch target block. | |
| | | | Specify the Block | Specify watch target block. | |
| | | | Stop Transition Watch Monitor when Detected | Select whether to detect other step that does not transfer while displaying warning dialog. | |
| | | | Monitor block start with new window | Select whether to open a corresponding SFC window to monitor when the active step transfers to a block start step. | Section 12.5.1 |
| PLC Read/Write | | | ☞ GX Works2 Version 1 Operating Manual (Common) | | |
| Online Change | | | ☞ GX Works2 Version 1 Operating Manual (Common) | | |
| Symbolic Information | | | ☞ GX Works2 Version 1 Operating Manual (Common) | | |
| Compile | Basic Setting | | Function Block Call*1 | Enables the followings: calling function block from ladder to ST and from ST to ladder, using inline ST in ladder and reducing steps when using function block. *Value of VAR_IN_OUT type input label always remains equal to the value of output label. | – |
| | | | Program Check | Check when program check is not needed after Build or Online Program Change. It can reduce the compile time depending on the setting. | |
| | | | Operational Setting | Select whether to use the same label name in global label and local label. When the same label is selected, local label will be given priority. | |
| | | | Build Cross Reference Information | By creating cross reference information after compiling, time to search cross reference can be reduced. Also able to search cross reference information even before compiling. In this case, the specified Find condition will be used as filtering condition. | (Common) |
| | Output Result | | Stop Build | Set the number of error and warning to stop the compile. | Section 10.4.1 |
| | | | Disable Warning Codes | Register warning codes to invalidate. The registered warning code shall not be displayed in output window. | |
| | ST*1 | Compile Condition 1 | Use lower-case device names as labels*2 | Select whether to use device names typed with lower case as labels. Only the device name outside device range is valid for Inline Structured Text. | (Structured) |
| | | | Function Output Setting | Select whether to connect directly from the objective function output to other input. | |
| | | Compile Condition 2 | (D)INT_TO_BOOL_E, (D)WORD_TO_BOOL_E, TIME_TO_BOOL_E | Select whether to generate a code to keep bit type output of objective function. | |
| | | | NOT_E | | |
| | | | LIMITAION_E, MAXIMUM_E, MINIMUM_E | | |
| | | | EQ_E, NE_E, GT_E, GE_E, LT_E, LE_E | | |
| | | | AND_E, OR_E, XOR_E | | |
| | Structured Ladder/FBD | | ☞ GX Works2 Version 1 Operating Manual (Structured Project) | | |

| Option tree item | Item | Description | Reference |
|---|---|---|---|
| Intelligent Function Module*1 | ☞ GX Works2 Version 1 Operating Manual (Intelligent Function Module) | | |
| IQ Works Interaction*1 | ☞ GX Works2 Version 1 Operating Manual (Common) | | |
| System Label Setting*1 | Use MELSOFT Navigator Option Information | Checking this option enables use of the option setting of MELSOFT Navigator. The option setting specified in MELSOFT Navigator at the time of opening this project is used. | Section 5.2 |
| | System Label Name Setting | Set how to name system labels. When system labels are entered, system label names are determined based on this setting at the time of project save. | |

*1: Not supported by FXCPU.

*2: Not supported by Simple project.

*3: For FXCPU, the item is supported by FX3G, FX3U and FX3UC only.

# APPENDIX

**Appendix 1 List of Toolbars and Shortcut Keys. . . . . App-2**

# Appendix 1 List of Toolbars and Shortcut Keys

Q CPU L CPU FX

This section shows the list of toolbars and shortcut keys that can be used in Simple project.

For (Common), (Structure), and (Intelligent) indicated in the Reference column, refer to the following manuals respectively:
(Common) .....GX Works2 Version 1 Operating Manual (Common)
(Structure) .....GX Works2 Version 1 Operating Manual (Structured Project)
(Intelligent) .....GX Works2 Version 1 Operating Manual (Intelligent Function Module)

## Appendix 1.1 Common toolbars and shortcut keys

The following explains the toolbars that are available regardless of the editing target and the corresponding shortcut keys.

### ■ "Standard" toolbar icons

The following table shows the "Standard" toolbar icons and the corresponding shortcut keys.

| Toolbar icon | Shortcut key | Corresponding menu | Description | Reference |
|---|---|---|---|---|
|  | Ctrl + N | New | Create a new project. | (Common) |
|  | Ctrl + O | Open | Open an existing project. | |
|  | Ctrl + S | Save | Save the project. | |
|  | F1 | GX Works2 Help | Display the GX Works2 Help screen. | |
| – | – | Find Help for GX Works2 | Search for help items with an entered keyword on the GX Works2 Help screen. | |

## ■ "Program Common" toolbar icons

The following table shows the "Program Common" toolbar icons and the corresponding shortcut keys.

| Toolbar icon | Shortcut key | Corresponding menu | Description | Reference |
|---|---|---|---|---|
|  | Ctrl + X | Cut | Cut the selected data. | Section 6.11 |
|  | Ctrl + C | Copy | Copy the selected data. | |
|  | Ctrl + V | Paste | Paste the cut/copied data at the cursor position. | |
|  | Ctrl + Z | Undo | Cancel the previous operation. | Section 6.12 |
|  | Ctrl + Y | Redo | Perform the operation canceled by [Undo]. | - |
|  | Ctrl + F | Find Device | Search for a device. | (Common) |
|  | – | Find Instruction | Search for an instruction. | |
|  | Ctrl + Alt + F7 | Find Contact or Coil | Search for a contact or coil corresponding a specified device. | |
|  | – | Write to PLC | Write data to the programmable controller CPU. | Chapter 11 |
|  | – | Read from PLC | Read data from the programmable controller CPU. | |
|  | – | Start Monitoring (All Windows) | Start monitoring all windows being opened. | Section 12.1 |
|  | – | Stop Monitoring (All Windows) | Stop monitoring all windows being opened. | |
|  | F3 | Start Monitoring | Start monitoring the window being operated. | |
|  | Alt + F3 | Stop Monitoring | Stop monitoring the window being operated. | |
|  | – | Device/Buffer Memory Batch Monitor | Batch monitor device/buffer memories. | (Common) |
|  | Shift + Enter | Modify Value | For ladder and SFC (Zoom) programs, change the ON/OFF and value of a device/label used in a program. | |
|  | F4 | Build | Convert/compile the program being edited. | Section 10.2.1 |
|  | Shift + F4 | Online Program Change | Convert/compile a sequence program and write it to the programmable controller CPU. | (Common) |
|  | Shift + Alt + F4 | Rebuild All | Compile/convert all programs in the project. | Section 10.2.2 |
|  | – | Start/Stop Simulation | Start/stop simulation. | (Common) |

## ■ "Docking Window" toolbar icons

The following table shows the "Docking Window" toolbar icons.

| Toolbar icon | Shortcut key | Corresponding menu | Description | Reference |
|---|---|---|---|---|
|  | – | Navigation Window | Display/hide the Navigation window. | (Common) |
|  | – | Function Block Selection Window | Display/hide the Function Block Selection window. | Section 6.3 |
|  | – | Output Window | Display/hide the Output window. | Section 10.4 |
|  | – | Cross Reference | Display/hide the Cross Reference window. | (Common) |
|  | – | Device List | Display/hide the Device List window. | |
|  | – | Watch | Display/hide the Watch window. | |
|  | – | Intelligent Function Module Monitor | Display/hide the Intelligent Function Module Monitor window. | (Intelligent) |
|  | – | Intelligent Function Module Guidance | Display/hide the Intelligent Function Module Guidance window. | |
|  | – | Find/Replace | Display/hide the Find/Replace window. | (Common) |

## ■ "Intelligent Function Module" toolbar icons

The following table shows the "Intelligent Function Module" toolbar icons.

| Toolbar icon | Shortcut key | Corresponding menu | Description | Reference |
|---|---|---|---|---|
|  | – | QD75/LD75 Positioning Module Wave Trace | Execute a wave trace of the QD75/LD75 positioning module. | (Intelligent) |
|  | – | QD75/LD75 Positioning Module Location Trace | Execute a location trace of the QD75/LD75 positioning module. | |
|  | – | Serial Communication Module Circuit Trace | Execute a circuit trace of the serial communication module. | |
|  | – | QD75/LD75 Positioning Module Test Monitor | Execute a positioning monitor of the QD75/LD75 positioning module. | |
|  | – | QD75/LD75 Positioning Module Test Monitor | Execute a positioning test of the QD75/LD75 positioning module. | |
|  | - | Offset/Gain Setting of Temperature Input Module | Execute offset/gain setting of the temperature input module. | |
|  | - | Offset/Gain Setting of Analog Module | Execute offset/gain setting of the analog module. | |

## ■ "Debug Function" toolbar icons

The following table shows the "Debug Function" toolbar icons.

| Toolbar icon | Shortcut key | Corresponding menu | Description | Reference |
|---|---|---|---|---|
|  | – | Stop | Stop the step execution. | (Common) |
|  | – | Cancel | Cancel the step execution. | |
|  | – | Break Execution | Execute the break execution. | |
|  | – | Step Execution | Execute the step execution. | |
|  | – | Execution Option | Display the "Execution Option" screen of the step execution. | |
|  | – | Set/Cancel Break Point | Set a break point at the cursor position, or cancel the set break point. | |
|  | – | Enable/Disable Break Point | Enable/disable the break point at the cursor position. | |
|  | – | Cancel All Break Points | Cancel all break points. | |
|  | – | Break Point Window | Display the Break Point window. | |
|  | – | Cancel All Break Devices | Cancel all break devices. | |
|  | – | Break Device Window | Display the Break Device window. | |
|  | – | Set/Cancel Skip Range | Set a skip range, or cancel the set skip range. | |
|  | – | Enable/Disable Skip Range | Enable/disable the skip range at the cursor position. | |
|  | – | Cancel All Skip Ranges | Cancel all skip ranges. | |
|  | – | Skip Range Window | Display the Skip Range window. | |

## ■ Other shortcut keys

The following table shows other shortcut keys that are available regardless of the editing target.

| Toolbar icon | Shortcut key | Corresponding menu | Description | Reference |
|---|---|---|---|---|
| – | F2 | Rename | Change the name of the selected data or library in the Navigation window. | (Common) |
| – | Delete | Delete | Delete the selected data. | |
| – | Ctrl + Shift + C | Copy | Copy data in the project. | |
| – | Ctrl + Shift + V | Paste | Paste the copied data to a folder. | |
| – | Ctrl + Shift + E | Add New Module | Add the intelligent function module data to the project being edited. | |
| – | Alt + F4 | Exit | Close the project being edited and exits GX Works2. | |
| – | Ctrl + E | Cross Reference | Create the cross reference information. | |
| – | Ctrl + D | Device List | Display the device list. | |
| – | F11 / Ctrl + . | – | Move to the next cross reference information. | |
| – | Shift + F11 / Ctrl + Shift + . | – | Move to the previous cross reference information. | |
| – | F12 / Ctrl + , | – | Move focus between the Cross Reference window and work windows. | |
| – | Ctrl + F | Find Device | Search for a device/label in the program. | |
| – | Ctrl + Shift + F | Find String | Search for a string. | |
| – | Ctrl + H | Replace Device | Replace a device/label in the program. | |
| – | Ctrl + Shift + H | Replace String | Replace a string. | |

| Toolbar icon | Shortcut key | Corresponding menu | Description | Reference |
|---|---|---|---|---|
| – | Ctrl + Alt + ↓ | – | Search for an item in the downward direction. | (Common) |
| – | Ctrl + Alt + ↑ | – | Search for an item in the upward direction. | |
| – | Shift + F3 | Start Watching | Start monitoring the current values of registered devices/labels and intelligent function module. | |
| – | Shift + Alt + F3 | Stop Watching | Stop monitoring the current values of registered devices/labels and intelligent function module. | |
| – | Ctrl + Enter | Register Device Test with Execution Condition | Register the device test with execution condition. | |
| – | Ctrl + F4 | – | Close the window displayed in the uppermost position. | |
| – | Ctrl + F6 | – | Move to the next uppermost window. | |

## Appendix 1.2 "Navigation Window" toolbar icons

The following table shows the "Navigation Window" toolbar icons.

| Toolbar icon | Shortcut key | Corresponding menu | Description | Reference |
|---|---|---|---|---|
|  | – | Add New Data | Add data to the project. | (Common) |
|  | – | Copy | Copy selected data. | |
|  | – | Paste | Paste copied data. | |
|  | – | Property | Display a property of the selected data. | – |
|  | – | Refresh | Update the display content of the Navigation window. | |
|  | – | Project Property | Display a property of the open project. | (Common) |
| | | Expand All Uncompiled Data | Expand all uncompiled data in the tree on the Project view and the User Library view. | |
| | | Collapse All | Collapse all data in the tree on the Project view and the User Library view. | |

# Appendix 1.3 Toolbar icons and shortcut keys for setting labels

The following explains the toolbar icons and the corresponding shortcut keys for setting labels.

## ■ "Label" toolbar icons

The following table shows the "Label" toolbar icons and the corresponding shortcut keys.

| Toolbar icon | Shortcut key | Corresponding menu | Description | Reference |
|---|---|---|---|---|
|  | Shift + Insert | New Declaration (Before) | Add a row above the cursor position. | Section 5.5.4 |
|  | – | New Declaration (After) | Add a row below the cursor position. | |
|  | Shift + Delete | Delete Row | Delete the row at the cursor position. | |
|  | – | Read from CSV File | Read label settings from the CSV file. | Section 5.8 |
|  | – | Write to CSV File | Write label settings to the CSV file. | |
|  | – | Confirm Update of System Label Database | Reflect system label information changed in another project on global labels. | Section 5.2 |
|  | – | Import System Label | Import system label information and reflect it on global labels. | |
|  | – | Register Device Name of System Label | Register a selected global label as a system label. | |
|  | – | Disable System Label Relation | Disable the relation between a selected global label and a system label. | |

## ■ Other shortcut keys

The following table shows other shortcut keys for setting labels.

| Toolbar icon | Shortcut key | Corresponding menu | Description | Reference |
|---|---|---|---|---|
| – | Ctrl + A | Select All | Select all rows. | Section 5.5.4 |
| – | Ctrl + + | – | Display all lines of comment and remark of the selected line. | |
| – | Ctrl + – | – | Display only the first line of comment and remark of the selected line. | |

# Appendix 1.4 Toolbar icons and shortcut keys for setting device memory

The following explains the toolbar icons and the corresponding shortcut keys for setting device memory.

## ■ "Device Memory" toolbar icons

The following table shows the "Device Memory" toolbar icons and the corresponding shortcut keys.

| Toolbar icon | Shortcut key | Corresponding menu | Description | Reference |
|---|---|---|---|---|
|  | – | Display Mode/Binary | Change display format to binary. | (Common) |
|  | – | Display Mode/Octal | Change display format to octal. | |
|  | – | Display Mode/Decimal | Change display format to decimal. | |
|  | – | Display Mode/ Hexadecimal | Change display format to hexadecimal. | |
|  | – | Display Mode/Float | Change display format to real numbers. | |
|  | – | Display Mode/String | Change display format to string. | |
|  | – | Display Mode/String (ASCII only) | Change display format to ASCII. | |
|  | – | Register/16-bit | Display data in units of words. | |
|  | – | Register/32-bit | Display data in units of double words. | |
|  | – | Register/64-bit | Display data in units of 64 bits. | |
|  | Ctrl + I | Input Device | Enter a device. | |
|  | – | FILL | Set the same value to continuous devices. | |
|  | – | Read Device Memory from PLC | Read data in device memory from a programmable controller CPU. | |
|  | – | Write Device Memory to PLC | Write data in device memory to a programmable controller CPU. | |
|  | – | Read from Excel File | Read data from an Excel file. | |
|  | – | Write to Excel File | Write data to an Excel file. | |

## ■ Other shortcut key

The following table shows other shortcut key for setting device memory.

| Toolbar icon | Shortcut key | Corresponding menu | Description | Reference |
|---|---|---|---|---|
| – | Insert | Insert Row | Insert a row at the cursor position. | (Common) |

## Appendix 1.5 Toolbar icons and shortcut keys for verification result

The following table shows the toolbar icons and the corresponding shortcut keys for the verification result.

| Toolbar icon | Shortcut key | Corresponding menu | Description | Reference |
|---|---|---|---|---|
|  | Alt + ↓ | Next Unmatch | Move to the next mismatched data. | (Common) |
|  | Alt + ↑ | Previous Unmatch | Move to the previous mismatched data. | |
|  | Alt + Back Space | Return to Result List | Display the <<Verify Result List>>. | |
|  | Ctrl + Delete | Close Detail Result | Close the <<Detail Verify Result>> being displayed. | |
|  | Ctrl + Shift + Delete | Close All Detail Result | Close all <<Detail Verify Result>>. | |
|  | – | Write to CSV File | Write verification result to a CSV file. | |

## Appendix 1.6 Toolbar icons for executing sampling trace

The following table shows the toolbar icons for executing sampling trace.

| Toolbar icon | Shortcut key | Corresponding menu | | Description | Reference |
|---|---|---|---|---|---|
|  | – | Trace Setting | | Display the Trace Setting screen. | (Common) |
|  | – | Start Trace | | Start sampling trace. To start sampling trace, the trace ready signal (SM800) must be ON. | |
|  | – | Stop Trace | | Stop sampling trace. | |
|  | – | Display Trace Buffer Condition | | Display the Trace Data Storage Status screen. | |
| Completion | – | Monitor Status | | Display the current sampling trace status | – |
| | – | | Execution Failed | Indicate the sampling trace stop status, or the status sampling trace has not started. | |
| | – | | Before Trigger | Indicate the status sampling trace is executed but a trigger is not generated. | |
| | – | | After Trigger | Indicate the status sampling trace is executed and a trigger is generated. | |
| | – | | Stop | Indicate the status sampling trace is interrupted. | |
| | – | | Completion | Indicate the status sampling trace has ended normally by acquiring trace data up to the specified total number of samplings after generation of a trigger. | |
| | – | | Error | Indicate the status a sampling trace error occurred during sampling trace. | |
|  | – | Buffer Status | | Displayed when the trace data have been acquired up to the specified total number of samplings. | |
|  | – | Trigger Occurrence | | Displayed when a trigger is generated during sampling trace. | |

| Toolbar icon | Shortcut key | Corresponding menu | Description | Reference |
|---|---|---|---|---|
|  | – | Zoom Out Timing Chart | Zoom the scale of timing chart | (Common) |
|  | – | Zoom In Timing Chart | | |
|  | – | Zoom Out Trend Graph | Zoom the scale of trend graph | |
|  | – | Zoom In Trend Graph | | |
|  | – | Switch Chart/Detail | Switch the trace result display on the Sampling Trace screen between the timing chart (graph) and the detailed data (value). | |

## Appendix 1.7 Toolbar icons and shortcut keys for program editors

The following explains the toolbar icons and the corresponding shortcut keys for program editors.

### ■ "Ladder" toolbar icons and shortcut keys

The following table shows the toolbar icons and the corresponding shortcut keys for the ladder editor.

| Toolbar icon | Shortcut key | Corresponding menu | Description | Reference |
|---|---|---|---|---|
|  | F5 | Open Contact | Insert an open contact at the cursor position. | Section 6.2 |
|  | Shift + F5 | Open Branch | Insert an open contact branch at the cursor position. | |
|  | F6 | Close Contact | Insert a closed contact at the cursor position. | |
|  | Shift + F6 | Close Branch | Insert a closed contact branch at the cursor position. | |
|  | F7 | Coil | Insert a coil at the cursor position. | |
|  | F8 | Application Instruction | Insert an application instruction at the cursor position. | |
|  | F9 | Horizontal Line | Insert a horizontal line at the cursor position. | Section 6.6.2 |
|  | Shift + F9 | Vertical Line | Insert a vertical line at the cursor position. | |
|  | Ctrl + F9 | Delete Horizontal Line | Delete the horizontal line at the cursor position. | Section 6.8.2 |
|  | Ctrl + F10 | Delete Vertical Line | Delete the vertical line at the cursor position. | |
|  | Shift + F7 | Rising Pulse | Insert a rising pulse at the cursor position. | Section 6.2 |
|  | Shift + F8 | Falling Pulse | Insert a falling pulse at the cursor position. | |
|  | Alt + F7 | Rising Pulse Branch | Insert a rising pulse branch at the cursor position. | |
|  | Alt + F8 | Falling Pulse Branch | Insert a falling pulse branch at the cursor position. | |
|  | Shift + Alt + F5 | Rising Pulse Close | Insert a rising pulse close at the cursor position. | |
|  | Shift + Alt + F6 | Falling Pulse Close | Insert a falling pulse close at the cursor position. | |

| Toolbar icon | Shortcut key | Corresponding menu | Description | Reference |
|---|---|---|---|---|
|  | Shift + Alt + F7 | Rising Pulse Close Branch | Insert a rising pulse close branch at the cursor position. | Section 6.2 |
|  | Shift + Alt + F8 | Falling Pulse Close Branch | Insert a falling pulse close branch at the cursor position. | |
|  | Alt + F5 | Operation Result Rising Pulse | Insert an operation result rising pulse at the cursor position. | |
|  | Ctrl + Alt + F5 | Operation Result Falling Pulse | Insert an operation result falling pulse at the cursor position. | |
|  | Ctrl + Alt + F10 | Invert Operation Results | Insert an operation result inversion at the cursor position. | |
|  | F10 | Edit Line | Input a line at the cursor position. | Section 6.6 |
|  | Alt + F9 | Delete Line | Delete the line at the cursor position. | Section 6.8 |
|  | Ctrl + B | Insert Inline Structured Text Box | Insert an inline structured text box. | Section 6.4.2 |
|  | – | Device Comment | Edit device comments. | (Common) |
|  | – | Statement | Edit statements. | Section 9.2 |
|  | – | Note | Edit notes. | |
|  | – | Statement/Note Batch Edit | Batch edit statements/notes. | Section 9.3 |
|  | Ctrl + L | Line Statement List | Display the list of line statements used in the program. | Section 9.6 |
|  | Ctrl + Alt + F1 | Display Template | Insert a template corresponds to the instruction/function/control syntax. | (Structured) |
|  | Alt + ← | Mark Template (Left) | Set an argument of the template in the selected status from the left by selecting the menu each time. | |
|  | Alt + → | Mark Template (Right) | Set an argument of the template in the selected status from the right by selecting the menu each time. | |
|  | Shift + F2 | Read Mode | Switch the mode of the open window to "Read Mode". | Section 6.1.2 |
|  | F2 | Write Mode | Switch the mode of the open window to "Write Mode". | |
|  | F3 | Monitor Mode | Switch the mode of the open window to "Monitor Mode" during monitoring. | Section 12.2 |
|  | Shift + F3 | Monitor (Write Mode) | Switch the mode of the open window to "Monitor (Write Mode)" during monitoring. | |
|  | Ctrl + Alt + F6 | Device Display | Display devices assigned by compilation. | Section 2.2.8 |
|  | – | Zoom | Change the display magnification ratio of the ladder. | Section 2.2.2 |
| – | Shift + Insert | Insert Row | Insert a row at the cursor position. | Section 6.9 |
| – | Shift + Delete | Delete Row | Delete the row at the cursor position. | |
| – | Ctrl + Insert | Insert Column | Insert a column at the cursor position. | |
| – | Ctrl + Delete | Delete Column | Delete the column at the cursor position. | |
| – | Ctrl + Shift + → | Connect Line to Right-Side Symbol | Connect a horizontal line to the ladder symbol at the right of the cursor position. | Section 6.6 |
| – | Ctrl + Shift + ← | Connect Line to Left-Side Symbol | Connect a horizontal line to the ladder symbol at the left of the cursor position. | |
| – | Ctrl + → | Enter/Delete HLine Rightward | Enter/delete a line at the right of the cursor position. | |
| – | Ctrl + ← | Enter/Delete HLine Leftward | Enter/delete a line at the left of the cursor position. | |

| Toolbar icon | Shortcut key | Corresponding menu | Description | Reference |
|---|---|---|---|---|
| – | Ctrl + ↓ | Enter/Delete VLine Downward | Enter/delete a line at the downward of the cursor position. | Section 6.6 |
| – | Ctrl + ↑ | Enter/Delete VLine Upward | Enter/delete a line at the upward of the cursor position. | |
| – | Ctrl + / | Switch Open/Close Contact | Switch a open contact to closed contact, and vice versa. | (Common) |
| – | Ctrl + : | Switch Statement/Note Type | Change the type of a statement/note. | Section 9.4 |
| – | Ctrl + Alt + Enter | Instruction Partial Edit | Open the Enter Symbol screen in which the first argument is in the selected status. | Section 6.2 |
| – | Alt + → / ← | – | Select a device/label on the Enter Symbol screen. Switch the device/label to be selected using the → / ← button. | |
| – | Alt + ↑ / ↓ | – | Increment/decrement a device/label on the Enter Symbol screen. | |
| – | Ctrl + Space | – | Display options of instruction/label on the Enter Symbol screen. | |
| – | Ctrl + ↑ / ↓ / → / ← | – | Move the cursor on the editing screen while the Enter Symbol screen is displayed. | |
| – | Ctrl + G | Jump | Display the specified row. | Section 8.1.2 |
| – | Ctrl + Alt + PgDown | Jump to Next Ladder Block Start | Jump a cursor from the current position to the start of the next ladder block. | Section 6.5 |
| – | Ctrl + Alt + PgUp | Jump to Previous Ladder Block Start | Jump a cursor from the current position to the start of the previous ladder block. | |
| – | Ctrl + F5 | Comment | Display device comments. | Section 2.2.4 |
| – | Ctrl + F7 | Statement | Display statements. | |
| – | Ctrl + F8 | Note | Display notes. | |
| – | Ctrl + – | Non-Display Ladder Block | Hide a ladder block. | Section 2.2.9 |
| – | Ctrl + + | Display Ladder Block | Display a hidden ladder block. | |
| – | Ctrl + turn mouse scroll wheel upward | Bigger | Change the display size of text larger on the editing screen. | Section 2.2.3 |
| – | Ctrl + turn mouse scroll wheel downward | Smaller | Change the display size of text smaller on the editing screen. | |
| – | Ctrl + Shift + Enter | Tile FB Horizontally | Tile the ladder editor and the function block program editor horizontally. | Section 6.3.5 |
| – | Ctrl + R | Back to Zoom SFC Block | Open the SFC diagram corresponds to the program on the Zoom editor window. | Section 7.9 |
| – | Shift + Alt + ↑ / ↓ / → / ← | Moves up/down/left/right | Move a cursor toward up/down/left/right of the SFC diagram. | – |
| – | Ctrl + F1 | Open Instruction Help | Display the Instruction Help screen. | Section 6.2.2 |
| – | Space | – | Display the Find screen. | – |
| - | F1 | Instruction Help | Display details of instructions. | (Common) |
| - | Ctrl + Shift + = | - | Enter an assignment operator (:=) when editing the inline structured text program. | (Structured) |

## ■ "SFC" toolbar icons and shortcut keys

The following table shows the toolbar icons and the corresponding shortcut keys for the SFC editor.

| Toolbar icon | Shortcut key | Corresponding menu | Description | Reference |
|---|---|---|---|---|
|  | F5 | [STEP] New Step | Insert  at the cursor position. | Section 7.3.1 |
|  | F6 | [B] Block Start Step (with END check) | Insert  at the cursor position. | Section 7.3.2 |
|  | Shift + F6 | [BS] Block Start Step (without END check) | Insert  at the cursor position. | |
|  | F8 | [JUMP] Jump | Insert  at the cursor position. | Section 7.3.8 |
|  | F7 | [END] END Step | Insert  at the cursor position. | Section 7.3.9 |
|  | Shift + F5 | [DUMMY] Dummy Step | Insert  at the cursor position. | Section 7.3.1 |
|  | F5 | [TR] Transition | Insert  at the cursor position. | Section 7.3.3 |
|  | F6 | [--D] Selection Divergence | Insert a selection divergence. | Section 7.3.4 |
|  | F7 | [==D] Simultaneous Divergence | Insert a simultaneous divergence. | Section 7.3.5 |
|  | F8 | [--C] Selection Convergence | Insert a selection convergence. | Section 7.3.6 |
|  | F9 | [==C] Simultaneous Convergence | Insert a simultaneous convergence. | |
|  | Shift + F9 | [ \| ] Vertical Line | Insert a vertical line. | Section 7.3.10 |
|  | Ctrl + 1 | No Attribute | Set the step attribute to No Attribute. | Section 7.5 |
|  | Ctrl + 2 | Stored Coil | Set the step attribute to Stored Coil. | |
|  | Ctrl + 3 | Stored Operation (without Transition Check) | Set the step attribute to Stored Operation (SE). | |
|  | Ctrl + 4 | Stored Operation (with Transition Check) | Set the step attribute to Stored Operation (ST). | |
|  | Ctrl + 5 | Reset | Reset the step attribute. | |
|  | Alt + F5 | Vertical Line (Draw Line) | Insert  at the cursor position. | Section 7.3.10 |
|  | Alt + F7 | Selection Divergence (Draw Line) | Insert  at the cursor position. | |
|  | Alt + F8 | Simultaneous Divergence (Draw Line) | Insert  at the cursor position. | |
|  | Alt + F9 | Selection Convergence (Draw Line) | Insert  at the cursor position. | |
|  | Alt + F10 | Simultaneous Convergence (Draw Line) | Insert  at the cursor position. | |
|  | Ctrl + F9 | Delete Line | Delete a line at the cursor position. | Section 7.4 |
|  | – | SFC Step/Transition Comment | Edit the SFC step/transition comments. | Section 9.8 |
|  | – | Sort SFC Step No. | Sort the SFC block step numbers. | Section 7.7 |
|  | – | SFC All Block Batch Monitoring | Batch monitor all blocks in the SFC program. | Section 12.5.4 |

| Toolbar icon | Shortcut key | Corresponding menu | Description | Reference |
|---|---|---|---|---|
|  | – | SFC Auto Scroll | Scroll the screen to display active steps automatically when they are out of the screen during monitoring. | Section 12.5.1 |
|  | Shift + F2 | Read Mode | Switch the mode of the open window to "Read Mode". | Section 6.1.2 |
|  | F2 | Write Mode | Switch the mode of the open window to "Write Mode". | |
|  | F3 | Monitor Mode | Switch the mode of the open window to "Monitor Mode" during monitoring. | Section 12.2 |
|  | Shift + F3 | Monitor (Write Mode) | Switch the mode of the open window to "Monitor (Write Mode)" during monitoring. | |
|  | – | Zoom | Change the display magnification ratio of the SFC diagram. | Section 2.3.2 |
| – | Shift + Insert | Insert Row | Insert a row at the cursor position. | Section 7.3.11 |
| – | Shift + Delete | Delete Row | Delete a row at the cursor position. | |
| – | Ctrl + Insert | Insert Column | Insert a column at the cursor position. | |
| – | Ctrl + Delete | Delete Column | Delete a column at the cursor position. | |
| – | Ctrl + G | Jump | Move a cursor to the SFC step number/ transition number in the specified block. | Section 8.2.1 |
| – | Ctrl + M | Find Jump Step | Move a cursor to the step of the jump source. | Section 8.2.2 |
| – | Numeric key | – | Move a cursor to the SFC step number/ transition number. | Section 8.2.3 |
| – | Ctrl + F5 | SFC Step/ Transition Comment | Display the SFC step/transition comments. | Section 2.3.4 |
| – | Ctrl + L / Ctrl + double-click | Open Zoom/Start Destination Block | Display the Zoom editor window or the start destination block. | Section 7.9 |
| – | Space | – | Display the start destination block. | |
| – | Ctrl + R | Back to Start SFC Block | Display the start source block. | |
| – | Ctrl + Alt + F8 | Program Display | Display programs on the SFC diagram when editing in MELSAP-L. | Section 2.3.3 |

## ■ SFC block list shortcut keys

The following table shows the shortcut keys for the SFC block list.

| Toolbar icon | Shortcut key | Corresponding menu | Description | Reference |
|---|---|---|---|---|
| – | Ctrl + G | Jump | Jump to the specified block number/data name. | Section 8.2.1 |
| – | Numeric key | – | Jump to the selected block number. | |
| – | Ctrl + F5 | SFC Block List Comment | Display comments of the SFC block list. | Section 7.11 |

# Appendix 1.8 Toolbar icons and shortcut keys for I/O system setting function

The following table shows the toolbar icons and the corresponding shortcut keys for the I/O system setting function.

| Toolbar icon | Shortcut key | Corresponding menu | Description | Reference |
|---|---|---|---|---|
|  | Ctrl + N | New | Create a new I/O system setting. | (Common) |
|  | Ctrl + O | Open | Open an existing I/O system setting. | |
|  | Ctrl + S | Save | Save the I/O system setting. | |
|  | Ctrl + X | Cut | Cut the selected data. | |
|  | Ctrl + C | Copy | Copy the selected data. | |
|  | Ctrl + V | Paste | Paste the cut/copied data at the cursor position. | |
|  | – | Execute I/O System Setting | Execute the I/O system setting function and starts simulation. | |
|  | – | Disable I/O System Setting | Disable the execution of the I/O system setting function. | |
|  | – | Start Monitoring | Start monitoring the I/O System Setting screen. | |
|  | – | Stop Monitoring | Stop monitoring the I/O System Setting screen. | |
| – | Alt + F4 | Exit I/O System Settings | Exit the I/O system setting. | |

# Appendix 1.9 Shortcut keys for operating intelligent function module

The following explains the toolbar icons and the corresponding shortcut keys for editing intelligent function module data.

## ■ Toolbar icons for positioning monitor function

The following table shows the toolbar icons for the positioning monitor function.

| Toolbar icon | Shortcut key | Corresponding menu | Description | Reference |
|---|---|---|---|---|
| | – | – | Monitor the operating status of positioning module. | (Intelligent) |
| | – | – | Monitor the start history. | |
| | – | – | Monitor the error history. | |
| | – | – | Monitor warning history. | |
| | F3 | – | Start the positioning monitor. | – |
| | Alt + F3 | – | Stop the positioning monitor. | – |

## ■ Toolbar icons and shortcut keys for editing predefined protocol support function data

The following table shows the toolbar icons and the corresponding shortcut keys for editing predefined protocol support function data.

| Toolbar icon | Shortcut key | Corresponding menu | Description | Reference |
|---|---|---|---|---|
| | Ctrl + N | New | Create a new protocol setting. | (Intelligent) |
| | Ctrl + O | Open | Open an existing protocol setting. | |
| | Ctrl + S | Save | Save the protocol information. | |
| | Ctrl + C | Copy | Copy the selected data. | |
| | Ctrl + V | Paste | Paste the cut/copied data at the cursor position. | |
| | – | Print | Print the protocol information. | |
| | – | Write to Module | Write data to a module. | |
| | – | Read from Module | Read data from a module. | |

# INDEX

## [A]

Action/Transition ..... 7-31
Active step ..... 12-8
Active Step Monitor ..... 12-14
Application Instruction ..... 6-6
array ..... 5-16
array element ..... 5-16, 5-24
Auto scroll monitoring ..... 12-9

## [B]

Batch deleting NOPs ..... 6-46
Batch editing Statements and Notes ..... 9-13
Batch inserting NOPs ..... 6-45
being on hold ..... 12-8
block information ..... 7-41
Block Information Find Device ..... 8-11
block start step ..... 7-12, 7-35, 12-9
block title ..... 7-41
buffer memory ..... 13-4

## [C]

Change Instance (Function Block) ..... 12-3
Change SFC Step No. ..... 8-9
Changing display size of editing screen ..... 2-5
Changing T/C Setting Values ..... 7-50
Changing the type ..... 9-15
Changing the Type (PLC/Peripheral) ..... 9-21
Check Program ..... 10-3
Checking for Errors and Warnings ..... 10-18
Class ..... 5-4, 5-9, 5-11
Close Branch ..... 6-6
Close Contact ..... 6-6
Coil ..... 6-6
Column ..... 2-8
Comment ..... 5-4, 5-9, 5-11, 5-20
comment that is appended ..... 9-3
Compilation ..... 10-8
Compile Condition ..... 13-5
Compiling ..... 10-5, 10-7
Conditions of Monitoring ..... 12-4
Consecutive entry button ..... 6-7
Consistency (pair) check ..... 10-3
Constant ..... 5-4, 5-9, 5-11, 5-20
contacts ..... 6-6
control SFC type ..... 7-46, 7-47
Converting ladder blocks ..... 10-2
Copy ..... 6-47
CSV file ..... 5-29
current values ..... 12-4
Cursor ..... 2-3
Cut ..... 6-47
Cutting, Copying, and Pasting SFC Diagrams ..... 7-30

## [D]

Data Name ..... 5-21, 5-23
Data Type ..... 5-4, 5-9, 5-11, 5-15, 5-16, 5-20, 5-21, 5-23
Data Type Selection screen ..... 5-15, 5-16
Delete Column ..... 6-41
Delete Horizontal Line ..... 6-38
Delete Line ..... 6-38
Delete Row ..... 6-41
Delete Vertical Line ..... 6-38
Deleting a ladder block ..... 6-37
Deleting columns ..... 6-44
Deleting lines of line statements ..... 9-17
Deleting rows ..... 6-42
Deleting SFC diagrams ..... 7-27
Deleting statements ..... 9-8
Detail Setting ..... 5-4, 5-9
Device ..... 5-4, 5-9, 5-21, 5-23
Device check ..... 10-3
Device Comment ..... 9-2, 13-3
Device Comment Display Format ..... 13-3
device types for function blocks ..... 6-24
Display Connection of Ladder Diagram ..... 2-9
display format ..... 12-4, 12-6, 13-4
Docking window ..... 2-2
drag and drop ..... 6-19
dummy coil ..... 7-35
Dummy Step ..... 7-10
Duplicated coil check ..... 10-3

## [E]

Edit FB Instance ..... 6-22
Edit Line ..... 6-32
editing screen ..... 2-3, 6-2
END line ..... 2-3
END Step ..... 7-23
Enter Line Statement ..... 9-4
Enter Note ..... 9-9
Enter P/I Statement ..... 9-5
Enter Symbol screen ..... 6-6
Enter VLine screen ..... 6-33
Entering notes ..... 9-9
Entering P statements and I statements ..... 9-5

## [F]

Falling Pulse ..... 6-6
Falling Pulse Branch ..... 6-6
Falling Pulse Close ..... 6-6
Falling Pulse Close Branch ..... 6-6
FB ..... 4-3
FB instance name ..... 6-19
Find Jump Step ..... 8-7
function block label setting ..... 6-18

function block selection window ..... 2-2, 6-18
function blocks ..... 6-24
FXGP(DOS) ..... 12-6
FXGP(WIN) ..... 12-6

## [G]

GX Developer ..... A-21
GX Works2 ..... A-21
GX Works2 Beginner's Manual (Simple Project) ..... A-12
GX Works2 Beginner's Manual (Structured Project) ..... A-12
GX Works2 Version 1 Operating Manual (Common) ..... A-12
GX Works2 Version 1 Operating Manual (Structured Project) ..... A-12

## [H]

High Performance Model QCPU ..... A-21
hold step ..... 12-8
Horizontal Line ..... 6-32

## [I]

I statement ..... 9-3
Inactive step ..... 12-8
Inline structured text ..... 6-26
inline structured text box ..... 6-27
Input FB Instance Name screen ..... 6-19
input ladder parts ..... 6-24
Insert Column ..... 6-41
Insert mode ..... 6-35, 6-48, 6-52
Insert Row ..... 6-41
Inserting columns ..... 6-43
Inserting lines within line statements ..... 9-16
Instruction check ..... 10-3
Instruction device entry field ..... 6-7
interrupt pointer number ..... 6-15, 9-3, 9-5, 9-6, 9-14
Invert Operation Results ..... 6-6

## [J]

Jump ..... 8-3, 8-6, 8-7, 8-10, 9-20
jump destination step number ..... 2-17, 8-9
jump transitions ..... 7-22
Jumping to ladder block start ..... 6-31
Jumping to specified statement and note ..... 9-20

## [L]

Label Name ..... 5-11, 5-20
Ladder check ..... 10-3
Ladder Editor ..... 2-3
Ladder Symbol ..... 6-6
Ladder symbol selection field ..... 6-7
Left power rail ..... 2-3
Line statement ..... 9-3
link memory ..... 13-4

## [M]

manuals ..... A-12
master control ..... 2-5, 6-5
Menu bar ..... 2-2
Merge Process ..... 9-28, 9-29
Modifying notes ..... 9-11
Modifying statements ..... 9-7
Modifying statements and notes ..... 9-15
monitor (write mode) ..... 6-4
monitor mode ..... 6-4
monitoring a program ..... 12-2
Monitoring buffer memory and link memory ..... 12-5
monitoring function block programs ..... 12-3
Monitoring operation outputs and transition conditions ..... 12-12
Monitoring SFC block list ..... 12-15
Monitoring SFC Programs ..... 12-8
Monitoring transitions ..... 12-11
monitoring value ..... 13-4
Moving statements or notes ..... 9-17

## [N]

Navigation window ..... 2-2
nesting number ..... 2-5, 6-5
New Declaration (After) ..... 5-18
New Declaration (Before) ..... 5-18
Normal SFC type ..... 7-46
note ..... 9-3, 9-15, 9-20
number of contacts ..... 2-9

## [O]

offset values ..... 5-24
Open Branch ..... 6-6
Open Contact ..... 6-6
operation output/transition condition ..... 7-24, 7-32, 7-34
Operation Result Falling Pulse ..... 6-6
Operation Result Rising Pulse ..... 6-6
options ..... 13-2
output ladder parts ..... 6-24
Output window ..... 2-2, 10-6, 10-7, 10-9, 10-18

## [P]

P and I statements ..... 9-6
P statement ..... 9-3
parameters for SFC programs ..... 7-45
Paste ..... 6-47
Paste Data screen ..... 7-30
Pasting function blocks ..... 6-19
Peripheral ..... 9-3, 9-4, 9-9, 9-14, 9-28
Personal computer ..... A-21

PLC ..... 9-3
pointer number ..... 6-15, 9-3, 9-5, 9-6, 9-14
project view ..... 4-2
property of SFC programs ..... 7-46

## [Q]

QCPU (Q mode) ..... A-21

## [R]

Read from PLC ..... 11-2
read mode ..... 6-3
Redisplaying SFC diagrams ..... 7-33
Registering undefined labels ..... 6-9
Replacing module I/O numbers ..... 8-5
required manuals ..... A-12
reset destination step number ..... 2-17, 8-9
reset step ..... 7-11
Restoring ..... 6-54
Right base line ..... 2-3
Rising Pulse ..... 6-6
Rising Pulse Branch ..... 6-6
Rising Pulse Close ..... 6-6
Rising Pulse Close Branch ..... 6-6
Row ..... 2-8

## [S]

Search and Replace ..... 8-2
Searching for statements and notes ..... 9-20
selection convergence ..... 7-17
selection divergence ..... 7-15
series transition ..... 7-13
SFC All Block Batch Monitoring ..... 12-13
SFC block ..... 7-41
SFC block list ..... 7-43
SFC comment ..... 9-30
SFC editor ..... 2-14
SFC Row Setting ..... 2-20
SFC step ..... 7-2, 7-10
SFC step active/inactive status ..... 12-14
SFC step attribute ..... 7-11, 7-29
SFC step comment ..... 2-17, 7-11, 7-12, 9-30
SFC step number ..... 2-17
SFC step/transition comments ..... 2-19
simple editing of devices/labels ..... 6-8
Simple project ..... A-22
simultaneous convergence ..... 7-19
simultaneous divergence ..... 7-16
Sort SFC Step No. ..... 7-32
Specification of module I/O number ..... 8-5
specified step number ..... 8-3
start destination block number ..... 2-17, 7-12
start destination blocks ..... 12-9
Starting monitoring of programs ..... 12-2
statement ..... 9-4
Statements and Notes ..... 9-2
Status bar ..... 2-2
Step number ..... 2-3
Stopping monitoring of function blocks ..... 12-3
Stopping monitoring of programs ..... 12-2
stops compilation ..... 10-8
structure ..... 5-20
Structure Array ..... 5-23
structure array type ..... 5-23
Structure Device Setting screen ..... 5-21, 5-23, 5-24
Structured Data Setting ..... 5-20
structured data type ..... 5-20
Structured Data Types ..... 5-15
Structured project ..... A-22

## [T]

T/C setting value ..... 6-62
Title bar ..... 2-2, 2-3
Toolbar ..... 2-2
Transition ..... 7-3, 7-4
transition comment ..... 2-17, 7-14, 9-30
Transition number ..... 2-17
two- or three-dimensional array ..... 5-16
Types ..... 9-3

## [U]

unconverted ..... 10-2
Undo ..... 6-53
Using bit specification ..... 5-22, 5-25

## [V]

Vertical Line ..... 6-32

## [W]

Warning ..... 10-18
warning message ..... 10-9
Work window ..... 2-2
wrapping ..... 6-55, 6-56, 6-57, 6-58
wrapping destination symbol ..... 6-17
wrapping source symbol ..... 6-16
write mode ..... 6-3
Write to PLC ..... 11-2
Writing/Reading ..... 11-2

## [Z]

Zoom ..... 7-34

# MEMO

Microsoft, Windows are registered trademarks of Microsoft Corporation in the United States and other countries.
Ethernet is a trademark of Xerox Corporation.
All other company names and product names used in this manual are trademarks or registered trademarks of their respective companies.

# GX Works2 Version1
# Operating Manual
# (Simple Project)

| | |
|---|---|
| MODEL | GXW2-VER1-O-SP-E |
| MODEL CODE | 13JU64 |
| SH(NA)-080780ENG-K(1109)KWIX | |

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
NAGOYA WORKS : 1-14 , YADA-MINAMI 5-CHOME , HIGASHI-KU, NAGOYA , JAPAN

When exported from Japan, this manual does not require application to the Ministry of Economy, Trade and Industry for service transaction permission.

Specifications subject to change without notice.